FLYING

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JUN 10 1946

THE MILES GEMINI
See page 43

Is Bikini a Fair Test?

SEE PAGE 17

Marchev's 'Folly'

THE STORY OF THE SEABEE

Flight Without Pilots

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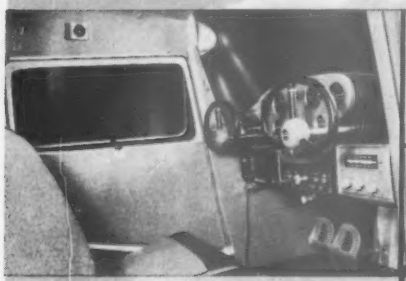
Any pilot can tell you why you get *More for your money* in a CESSNA

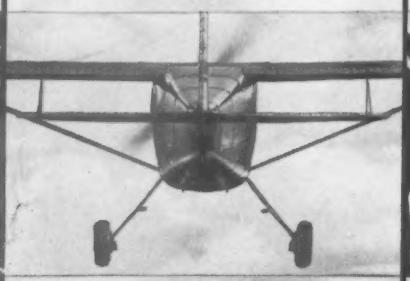


Comfort Plus is built right into the Cessna 140 with its roomy, adjustable seats, high enough above floor level for natural leg position. And the sound-proofed cabin is beautifully upholstered in fine two-tone materials.

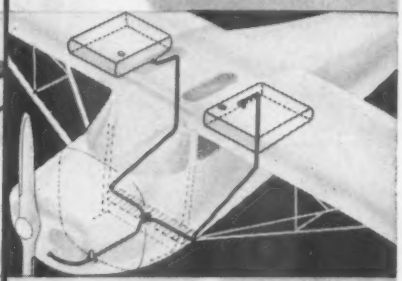
All-Metal Monocoque Construction is an outstanding fuselage feature of all the new Cessnas . . . combining maximum strength with minimum weight for longer life, less maintenance, greater safety, and performance.

80-Pound Luggage Capacity means there's ample room in the large compartment for two large suitcases and two large brief cases, or for three suitcases. And there's a handy utility shelf for hats and parcels.

Full-Range Flaps increase performance. They can be set instantly for any desired angle of glide in the approach with a touch of the *convenient* finger-tip control. They can also be used for *unusually* short take-offs.



Patented, Safety Landing Gear is a real safety feature on all Cessnas. It actually combats ground looping tendencies, taxis easily even in high winds. And there are no moving parts to wear, rattle or service.



Ample Cruising Range assures 4½ hours or over 450 miles non-stop flying in the 140. Top speed is over 120 m. p. h. and twin wing tanks carry 25 gallons of fuel. You can really go places and see things in a Cessna.

CESSNA *ALONE* GIVES YOU ALL THESE FEATURES IN THE LOW-PRICED FIELD.

All These Features and Many More, such as starter, generator and battery, are standard equipment on the smart, speedy, two-place Cessna 140, at only $3245.00 F. O. B. Wichita. The Cessna 120, also equipped with an 85 h. p. Continental engine, flush doors, safety landing gear, quick-service cowling, full-size hydraulic toe brakes, sun-proof windshield . . . but without starter, generator and flaps . . . delivers for only $2695.00 F. O. B. Wichita. Both sleek, fast, two-place airplanes have service ceilings of 15,500 feet. And they're both ready for you now at your Cessna dealer's. Late this year two new all-metal, four-place Cessnas, the "170" and the "190", will be added to the line for those who want real "big airplane" room, speed and performance.

So, before you buy, be sure to fly a Cessna. Compare. And you, too, will choose Cessna.

CESSNA AIRCRAFT CO., DEPT. S, WICHITA, KANSAS

Cessna

THE PILOT'S AIRPLANE

ARMY ★★ E ★★ NAVY

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F677
v.39
1946

The floor that walked before it flew

THE soft, comfortable feel of walking on plush carpeting is a luxury for the airline traveler, but it's a headache to the maintenance crew. Frequent cleaning, necessary to keep up a sanitary freshness, takes time, speeds wear. Rugs shrink, making it difficult to install them neatly.

To provide a cushioned flooring material, B. F. Goodrich developed a flight rug with a resilient sponge rubber base, and a new plastic covering made from limestone, coke and salt. The covering comes in rich colors, can be inlaid with attractive patterns.

Then, an enterprising foreman in Braniff Airways' upholstery shop decided to test the flooring by walking on it. He made the test tough on the flooring material, too. He had his shoes soled with the material, walked on them over the gravel runways, on the concrete floors of the shop.

The soles took the rough treatment, still looked good as new. And the test satisfied an exacting customer that the new B. F. Goodrich Flight Rug had the high abrasion-resistance needed for long, economical service. They also liked its beauty, the fact that it can be so easily cleaned with any good cleaner, the comfort of the cushioning, and the fact that it's fire-resistant.

B. F. Goodrich makes a complete line of airplane upholstery materials. For further information, write to The B. F. Goodrich Company, Aeronautical Division, Akron, Ohio.

B.F. Goodrich

FIRST IN RUBBER

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FLYING

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JULY • 1946

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THE COVER

Charles E. Brown, an Englishman who is considered one of the world's best aviation photographers, took the picture on FLYING's cover this month. The airplane is the Miles Gemini, and is described in detail on page 43. It is one of the few new British post-war planes for the private flyer. Nearly all present private planes in Britain are pre-war designs, some of them dating as far back as the early 1920s.

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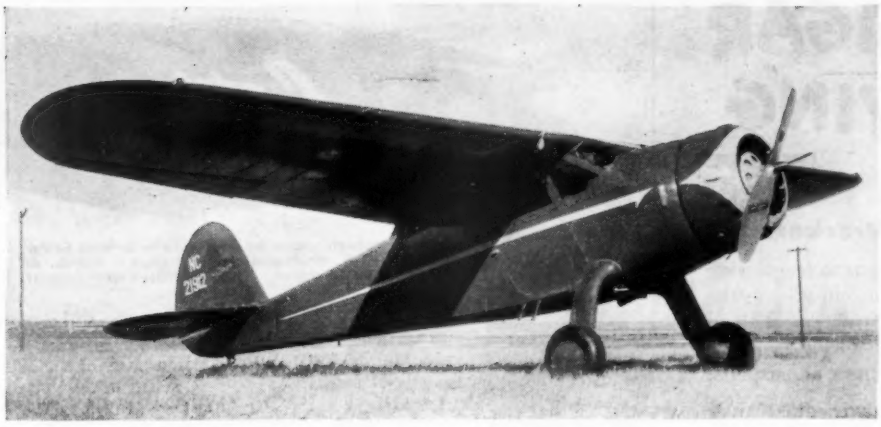

ARE YOU GETTING SWEET ON A CESSNA?

You lucky fellow! It's probably the beginning of a long and beautiful friendship! New places . . . new faces . . . more fun than you've ever had before!

May we make a little suggestion? You'll undoubtedly be flying over Phillips Territory (the great big Middle-West). Whether you set down at a big-city airport or a prairie flying field, ask for Phillips 66 Aviation Products!

They bear the seal of a great company. They were perfected by air-minded men who spend more hours in the air than behind a desk. And, for better carburation and a cleaner motor, we've taken the trouble to manufacture a plentiful supply of *un-leaded* 80 octane gasoline—and to rush it to all the Phillips fields in our territory. Patronize the "66" pump, won't you?

We'll be seeing you!

Phillips 66

AVIATION GASOLINE

HANGAR FLYING

LOCKHEED

The Wreckers

If you ever want to tear a wing off an airplane, check with the men in the Structures Lab at Lockheed's Factory B-1 in Burbank. These boys are experts.

Not long ago their entire career consisted of deliberately ruining the meticulously engineered assemblies that went into the *Constellation*, just to see if the parts came up to Lockheed's exacting standards.

For instance: they took up number 61 (the first *Constellation*), blew a hole in one of the two tires on the nose landing gear, and then brought the plane in at 80 mph. The *Constellation* landed nicely.

Another time these testers purposely threw dirt and water into the oil lines of the hydraulic booster system, forcing it to work under what they understate as "adverse conditions." Adverse, that is.

They even kicked around a whole tail control assembly in a chamber that was 70 degrees below zero (Fahrenheit) until all the low-temperature bugs had been licked.

As a result of this kind of highly creative destruction, which goes on at Lockheed year in and year out, the *Constellation* is the most advanced and safest transport in service today.

L to L for L

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Letters

Reader comments should be addressed to Letters Editor, FLYING, 185 N. Wabash Avenue, Chicago 1, Illinois. All letters should be signed. Names withheld upon request.

STALLING SPEEDS

In Lawrence Keil's article "Altitude and Take-Off" (FLYING, March, 1946), he states "All stalling speeds of aircraft are based on true air speed." I think it should read, "All stalling speeds of aircraft are based on indicated air speed."

Mr. Keil should try a series of gently-entered, straight-ahead, power-off stalls, the first one as near sea level as practicable, the second one at 10,000 feet, and the third at 15,000 feet or higher. He will notice that, regardless of temperature or altitude, the stall will break at the same I.A.S.

LIEUT. DOUGLAS E. SMITH
Van Nuys, Calif.

● The stall always is based on true air speed. Reader Smith is partially correct in that true air speed increases two per cent per 1,000 feet, hence indicated air speed may or may not approach true air speed at 5-, 10-, and 15,000 feet. But if he had no way of checking the accuracy of his air speed indicator, how could he check approach to stall by his I.A.S.?—ED.

THE HUMMING BIRD DOES IT

I quote from "The Helicopter Today" by James G. Ray (FLYING, January, 1946):

"At low speed they move in any direction regardless of heading. And, of course, the third dimension is added, giving complete freedom of movement in every conceivable direction—the first time man has ever attained it. As a matter of fact, such complete freedom of movement does not occur in nature."

Has Mr. Ray never heard of the humming bird? If he will check the encyclopedia he will discover one of nature's creations that can fly in any direction regardless of heading.

CPL. RICHARD O. HERRICK
Munich, Germany

"BOMBER" POWERS

We wish to congratulate you on your article in FLYING for April, 1946, entitled "Bomber Powers." It is the first revealing the true courageous character of our Air Force pilots and we feel that his incredible feats should be more widely publicized as an inspiration to the air-minded youth of America.

To our knowledge only one other aircraft has been landed with but half a wing. This was a *Corsair* on which the left wing panel was torn off carrying with it the canopy, thus disengaging the pilot's oxygen mask, rendering him temporarily unconscious. The plane spiraled down to an altitude of 250 feet where the pilot recovered in time to haul the stick back and slide into a nearby cow pasture with only minor injuries.

Some parts of the article caused a little skepticism in our barracks and if it were not for the fact that Power's tail gunner is attending school here we might have thought FLYING was trying to put something over on its readers.

Let's have more articles like this.

FOUR V-5 TRAINEES
University of Southern California
Los Angeles, Calif.

WANTS "FOR IDENTIFICATION"

What has happened to that interesting feature called "For Identification" that has been missing from FLYING all these months? I would like to see silhouettes of some of the new Army and Navy planes, such as the *Fireball*, *Phantom*, *Harpoon*, *Mauler*, *Rainbow* and the *XP-81*. If that's not enough, how about some silhouettes of the private planes?

ARTHUR E. KEELER
White Plains, N. Y.

● This feature was discontinued shortly after the end of the war because of the reduction in new types of military aircraft. Also, there is no longer the urgent need among FLYING's readers for recognition aptitude.—ED.

ALTITUDE RECORD?

I recently made a flight that may interest you. It won me a five dollar bet with a friend who didn't believe a Piper *Cub* J-3C could climb over 12,000 feet. I took off from the local airport at Stockton and when I arrived over San Francisco, 70 miles distant, I was at an altitude of 16,100 feet. There the motor slowed down and would not pull me any higher. I tried for 10 minutes but the *Cub* had reached its ceiling. My friend is endeavoring to win his money back by betting that this is not a record altitude flight for a *Cub* with a 65-h.p. engine.

I know that this flight contributes little toward the progress of aviation but I would appreciate it if you could settle our last bet for us.

WILLIAM C. DEVINE
Stockton, Calif.

● Official lightplane altitude record is not held by *Cub*. . . . An altitude record of 24,310.975 feet was established on September 12, 1940, in Burbank, Calif., in a 65-h.p. Continental-powered Taylorcraft. Will this help settle the bet?—ED.

SKYRANCH A MYTH?

After reading the article "Skyranch" in the March, 1946, issue of FLYING, I checked the manager's expected profit

(*Continued on page* 108)

Statement OF POLICY

It is the purpose of Lear, Incorporated to see that Lear Aircraft Radios are never far from competent service.

Toward this end a carefully chosen distributor organization is taking form from coast to coast. These distributors are well equipped both in ability and facilities to provide thorough testing and everything that the owner of a Lear Aircraft Radio may require.

Already there is a large group of these authorized distributors. And almost daily additional ones are being franchised.

These distributors will stand ready to supply new Lear Aircraft Radios and equipment. And *any established aviation dealer or operator* is entitled to purchase Lear equipment from them.

In this way, we believe, Lear can best serve the interests of those connected with the aircraft industry. LEAR, Incorporated, Aviation Radio Sales, 110 Ionia Avenue, N. W., Grand Rapids 2, Michigan.

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The Name Men Fly By

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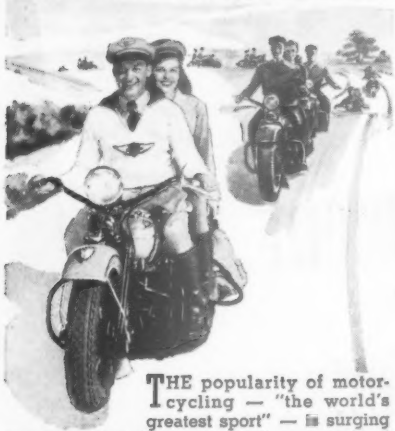

THE popularity of motorcycling — "the world's greatest sport" — is surging to new highs! Thousands and thousands of enthusiasts — old and new — want Harley-Davidsons. Our production rate is at an all-time peak — but dealers are selling Harley-Davidsons faster than we can ship them.

If you want the thrill of Harley-Davidson ownership — and all the fun and thrills of motorcycling — see your Harley-Davidson dealer EARLY! Latest models give you so much in power, speed and stamina, they're well worth waiting for until your dealer can deliver your Harley-Davidson. *Write for Enthusiast Magazine and other literature.*

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Department F Milwaukee 1, Wisconsin

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This makes it SHOCKPROOF
SELF-WINDING—
Tourneau's "never-have-to-wind" waterproof, shockproof, antimagnetic watch, designed for dependability
In steel 57.75*
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431 MADISON AVENUE, AT 49th STREET N. Y.

Have You Heard?

. . . **New York Yankees are taking to the air** since President Larry MacPhail signed a contract with United Air Lines to fly the baseball team on all its major trips in the 44-passenger "Yankee Mainliner." They are the first major league club to adopt air transportation for a full schedule. United Air Lines has also contracted with the All American Football Conference for team air transportation during 1946 at an estimated cost of $250,000.

. . . **Helicopter mail pick-up service** will soon be initiated for Chicago suburbs. Preliminary plans call for the craft to make two or three flying circuits a day to the suburbs, which will save a full day in mail deliveries.

. . . **An airliner requires more than 87 employees** and nine pilots (including co-pilots) for operation, according to a survey made last February. This compares with 49 employees and six pilots per plane only 4½ years ago.

. . . **Aerial navigators** have recently formed a non-profit organization called American Navigation Association, in Houston, Tex. Persons eligible for membership are servicemen or civilians who have had actual experience in using navigational aids and employees of firms engaged in or interested in the development of navigation.

. . . **France's new roadable plane,** the *Aviauto,* is a four-place, twin-engined, twin-boom craft, which can strip from plane to auto in five minutes. A new French transport now in production, is the 400-ton *Hamel* flying boat which will cruise at 300 m.p.h., carry 200 passengers and 80,000 pounds of cargo.

. . . **A shock-proof rubber air** mail bag has been developed by U. S. Rubber Co. for carrying air mail to isolated communities. Cargo ranging from eggs to hardware contained in the heavily-reinforced bag can be dropped from a speeding plane without damage.

. . . **England will soon have Ercoupes,** according to a recent report. Engineering & Research Corp. will either open a plant or license production of the *Ercoupe* there.

. . . **A movie was premiered on an airliner** recently for the first time as a Pan American *Constellation* en route to London flew across the Atlantic at 300 m.p.h. All Pan Am *Clippers* will soon have movie equipment.

. . . **A new type of rotating wing plane,** incorporating features of the helicopter and autogiro, is to be produced by Fairey Aviation Co. in England. Called a *Gyrodyne,* it is a five-place craft designed for air taxi service, charter work and private flying. Officials claim it is less complicated to handle and has a higher safety factor than either the autogiro or helicopter. No details have, as yet, been revealed.

. . . **Flying babies** get special care on some airliners. As a mother boards a TWA plane, she is handed a luggage-type kit designed to meet baby's needs during each moment of flight. And United Air Lines has so-called Nursery-liners with two registered nurses aboard who provide constant care, baby foods and playthings.

. . . **The Veteran's Air Express,** one of the newest U. S. airlines, has a personnel now numbering 90 veterans of the armed forces. Its first transatlantic flight linked Prague with New York and carried a shipment of 55,800 eggs to Czechoslovakia for UNNRA. Not a shell was cracked.

. . . **Weather guides for passengers** provided by Eastern Air Lines enable them to judge temperature of destination and carry proper clothes. The guide is issued for each season of the year to cover each of 12 areas in which the airline operates. Its contents are not predictions—but a temperature condition analysis of specified areas based on daily normal temperature areas in the United States.

. . . **Michigan's first "Heliport,"** planned for the roof of a department store in Grand Rapids, will offer taxi service between the city's business district and airport. Northern Air Service filed application with the Michigan Aeronautical Commission for permission to operate this service after the Kent County airport committee approved plans and recommended permit.

. . . **Fixed Base "Pirates,"** who attempt to run airlines in Britain under the guise of charter services, will be liable to a fine of $20,000 or two years imprisonment under the government's Civil Aviation Bill. These precautions have been included to protect the three public corporations set up to run the whole of Britain's nationalized airlines—British Overseas Airways, British European Airways and British South American Airways.

. . . **Planes help steer Navy carriers** when they are travelling at low speeds in narrow waters. Two rows of *Corsairs,* for example, are lined up facing each other along the forward part of the flight deck. Wheel chocks are placed, planes lashed down and engines revved to move the ship in either direction. END

AERONCA's "BIG 3" FOR HAPPIER LANDINGS!

LANDINGS AND TAKEOFFS MADE EASY—THANKS TO

1) 300° VISIBILITY!

The Aeronca Champion, alone among low-priced planes, offers it! Thanks to lower cowling, exceptionally large side and rear windows, big one-piece plexiglas windshield you have unsurpassed vision, whether taking off, landing or cruising!

2) 38 M.P.H. LANDING SPEED!

Yes, with its new low landing speed you can land the Aeronca Champion almost anywhere. A small field provides adequate space. You pick your spot and come down. Helps the beginner learn to land easily.

3) OLEO LANDING GEAR!

Cushions your landing so you come down gently and easily! Oleo heavy-duty landing gear is a feature not only of the Champion (Tandem) but also of the Chief (Side-by-side model). Both of these luxury, low-cost planes are now in full production.

OUTSTANDING FEATURES OF THE AERONCA CHAMPION

Wing Span.....35 ft.	Cruising Speed.....90 mph.
Length.....21 ft. 6 in.	Rate of Climb 500 ft. per min.
Wing Area.....170 sq. ft.	
Power Plant....65 Hp. Motor	Fuel Capacity.....13 gals.
Gross Weight.....1220 lbs.	Cruising Range....270 miles
Top Speed.....100 mph.	Price.....$2295 FAF

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America's No. 1 Low Cost Plane

Seabee

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4-PLACE
AMPHIBIAN
CHOOSES

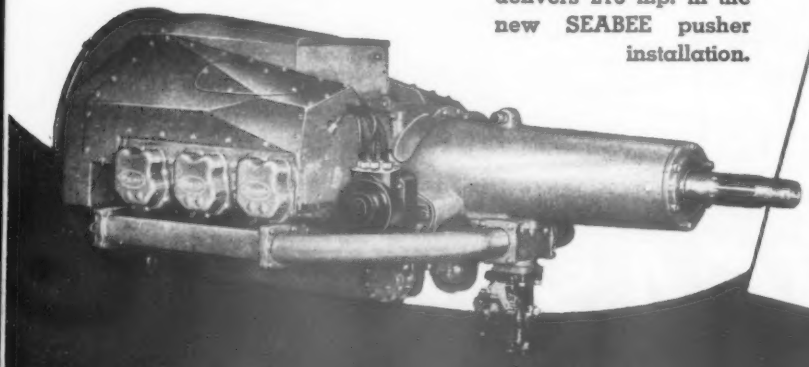
POWER by FRANKLIN

When Republic Aviation, makers of the mighty Thunderbolt, entered the personal plane field, you'd expect them to produce a leader . . . and they have! It's the Seabee, a sturdy, powerful, all metal, four-place amphibian. The Seabee is designed to go anywhere . . . and do everything you expect from your personal plane. Naturally, it's powered by FRANKLIN, for such a leader among planes deserves an engine that's a leader, too. Today's Franklins climax 46 years of air-cooled engine-building experience . . . reach new highs in dependability, economy and performance.

Look for Franklin power in your new personal plane!

FRANKLIN "500" WITH EXTENSION SHAFT

delivers 215 h.p. in the new SEABEE pusher installation.



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. . . and other new planes soon to be announced.

Now on Edo Floats

Photo by Groenhoff

ERCOUPE . . *First Two-Control Float Plane*

Edo floats are available for Ercoupe. Now, for the first time, all the advantages of float flying are combined with a two-control plane. And this spin-proof, easy-to-fly aircraft takes on new utility with floats. All Ercoupe safety, speed and automatic coordination are yours, plus the new freedom of flight possible only on floats.

If you already own a 1946 Ercoupe, the change-over from tricycle gear to floats is simple—a mere matter of hours. Or if you have an Ercoupe on order, it can be delivered as a float plane.

As a pilot, you'll get added pleasure out of your plane if you add floats. As an operator, you'll find more students eager to fly this modern spin-proof plane, especially when it has the added feature of Edo floats. Get in touch with your Ercoupe distributor or dealer now, to assure priority on delivery.

Edo Floats Available For These Planes

- ★ AERONCA CHIEF
- ★ AERONCA CHAMPION
- ★ CESSNA 120, 140
- ★ FAIRCHILD 24
- ★ LUSCOMBE SILVAIRE
- ★ PIPER CUB SPECIAL
- ★ PIPER SUPER CRUISER
- ★ STINSON VOYAGER 150
- ★ TAYLORCRAFT B SERIES

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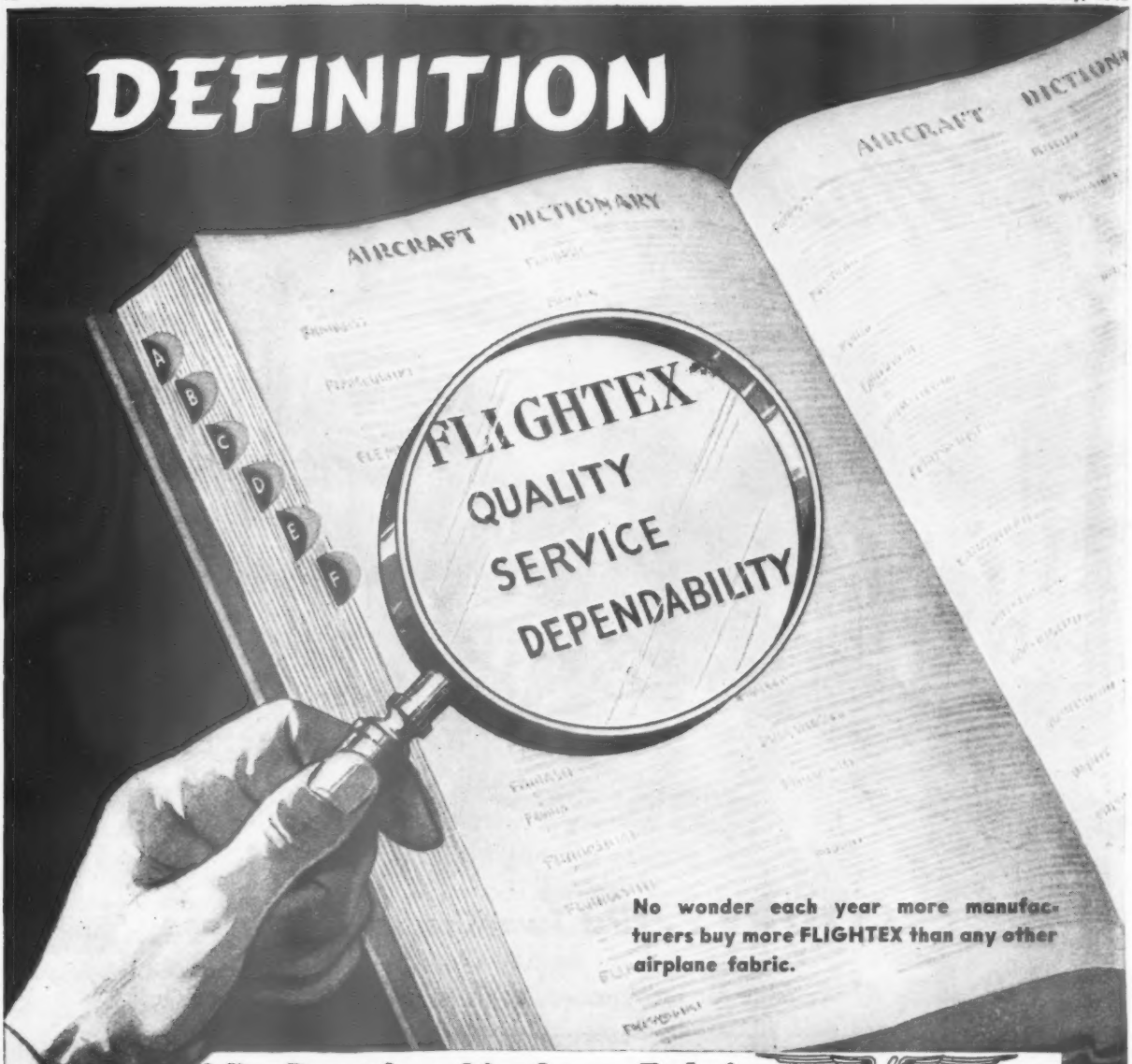
DEFINITION



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24,311 feet. Set by Grace Huntington at Los Angeles, Cal. International record for airplanes of second category.

FURTHER — 1700 Miles in 16½ Hours

Flight made by Mrs. Evelyn Burleson from Vancouver, B. C. to Tia Juana, Mexico. Gross load of 1462 pounds.

FASTER—*Speed Record for Light Planes*

Winner of the Firestone Trophy at the races held at Miami in Feb. 1946.

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Hunter and Humphrey Moody took off on July 22, 1939, and landed two weeks later.

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IN THESE busy days of reconversion and struggle toward full attainment of peacetime production a machine that would expand each day for your organization's top executives and key personnel would be invaluable.

A twin-engine Beechcraft can't change the speed of the clock, but it can serve to expand the utility of each minute connected with co-ordination and liaison between widely scattered corporate operations.

Assume two plants 400 miles apart and off the regular airline routes. By surface travel a round trip and consultation will be at least a tiring 36-hour affair. By Beechcraft your valued executive can spend an hour or two at his own desk in the morning; fly 400 miles in less than two hours of relaxed travel; have lunch and consult for two hours with the personnel of the other plant; fly home and be there before the close of the business day. If desired, he can consult and confer with others en route or can dictate correspondence while in flight. Not only has time been expanded in utility, but also the mental reluctance connected with a tiresome trip has been eliminated.

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FLYING
JULY, 1946

IS Bikini A FAIR TEST?

Is the ghost of Billy Mitchell laughing a bit as history repeats itself? Will the Bikini plan, studied here by the A-bomb evaluation committee, be a repetition of the Virginia Capes episode?

AN AIR-POWER EXPERT CHARGES THE DICE ARE LOADED.

By
Col. HARRY A. TOULMIN, Jr.
As Told To DOUGLAS J. INGELLS

Chief of Staff (under General Mitchell) in 1918, Colonel Toulmin was Assistant to the Commanding General, Air Service Command, in World War II, and was an Army Pearl Harbor Board member. Non-partisan as to the issue he raises, FLYING feels that Colonel Toulmin's article deserves careful thought in any discussion of A-Bomb tests.

BACK in 1921 they called it "Mad Mitchell's Folly." Its modern name is "Operation Crossroads." Whatever it's called, the issue is still the same—whether airpower or seapower dominates the world. It is not a very sensible controversy—it's ironic that we should even have to hear it again.

Operation Crossroads, as you probably know, is the code-name for the atom-bomb-versus-battleship trials. The name derives from the fact that someone afflicted by the atom-bomb hysteria advanced the theory that these tests would put us at the "crossroads of civilization"—one world or no world at all. The real issue, however, isn't that alarming. The tests are being staged (*Continued on page* 84)

Farm airplanes are teaming up with tractors and other agricultural implements on the larger American farms.

Farmers are buying airplanes because they're proving useful.

THE LIGHTPLANE GOES FARMING

By FRED HAMLIN

IT ISN'T THE CITY slicker who is leading the way into the sky. It's Farmer Brown and his flying sons and daughters. The city fellows are talking a big game but the people living behind the R.F.D. mail boxes are really doing something. It's much like flying enthusiast Henry Wallace, Secretary of Commerce and boss of the CAA, says:

"Just as motorized implements have become a familiar sight on the farm, so during the next decade we can expect to see widespread use of the airplane in agriculture. Many progressive farmers already are finding the lightplane invaluable for personal transportation. In addition, whether (*Continued on page* 68)

CESSNA 140 USED ON KANSAS FARM EMPHASIZES UTILITY OF PRIVATE AIRCRAFT

THE FAIRCHILD IS MET AT TAMPICO BY AIRPORT OFFICIALS.

SWARMS OF LITTLE BOYS GREET THE PLANE AT MEXICO CITY.

Before You Fly TO MEXICO

By WILLIAM B. SHERRILL

Want to make a lightplane trip to Mexico? It's easy to do and it's fun—but there are plenty of things you'll need to know besides how to handle a plane and chart a flight plan.

As a matter of fact your flight plan can be pretty much as you want it. Study a map of Mexico and choose a spot you want to visit—odds are that there'll be a good airport nearby. Regardless of your destination, it will rarely involve more than a 2,000-mile round trip from your port of entry. And you'll never have to climb your plane to more than a 10,000-foot altitude.

Flying down to Mexico does have its differences—expensive differences if you don't know the ropes. There's the little matter of *servicios extraordinairia* that we'll discuss later. Right now we'd better talk about how you get into Mexico. It's not as simple as hopping off from La Guardia for a pleasure cruise to Miami Beach—not until you've learned the rules.

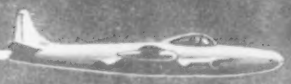
There are two ports of entry available, the Rio Grande Valley International Airport at Brownsville, Tex., and the Municipal Airport at San Antonio. Your best bet is Brownsville. The "Tip-O-Texas" city provides complete facilities for obtaining clearance papers for yourself, your plane, and your passengers.

If San Antonio's port of entry is more convenient to your route, you will find all offices in downtown San Antonio except those of the *Departamento de Aeronautica Civil de Mexico* (*Continued on page 75*)

International Airport, Brownsville, Tex., is port of entry for the Rio Grande Valley.

HERE'S SOME GOOD ADVICE THAT MAY SAVE YOU MANY A PESO.

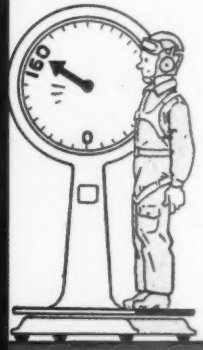
What Speed CAN MAN STAND?

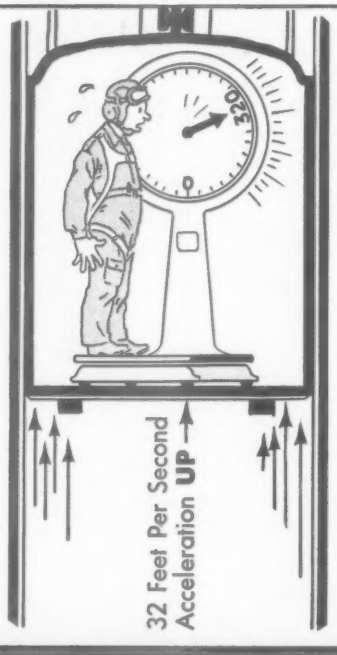


There is no limit to the speed our bodies can withstand. Man can fly as fast as any plane can ever be made to carry him. But—he can accelerate only within sharply defined limits. It is not speed but change in speed or direction that affects our bodies unfavorably. These changes are measured in "G".

WHAT IS "G"?

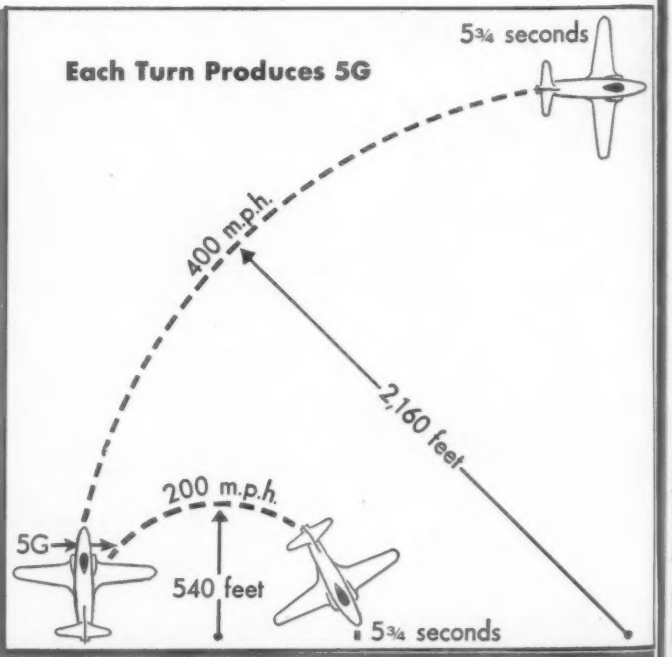
"G" is the symbol for a force equal to Gravity. One "G" is a force equal to your weight, 2G to twice your weight, and so on. "G" is used to measure changes in acceleration or in the direction of travel.



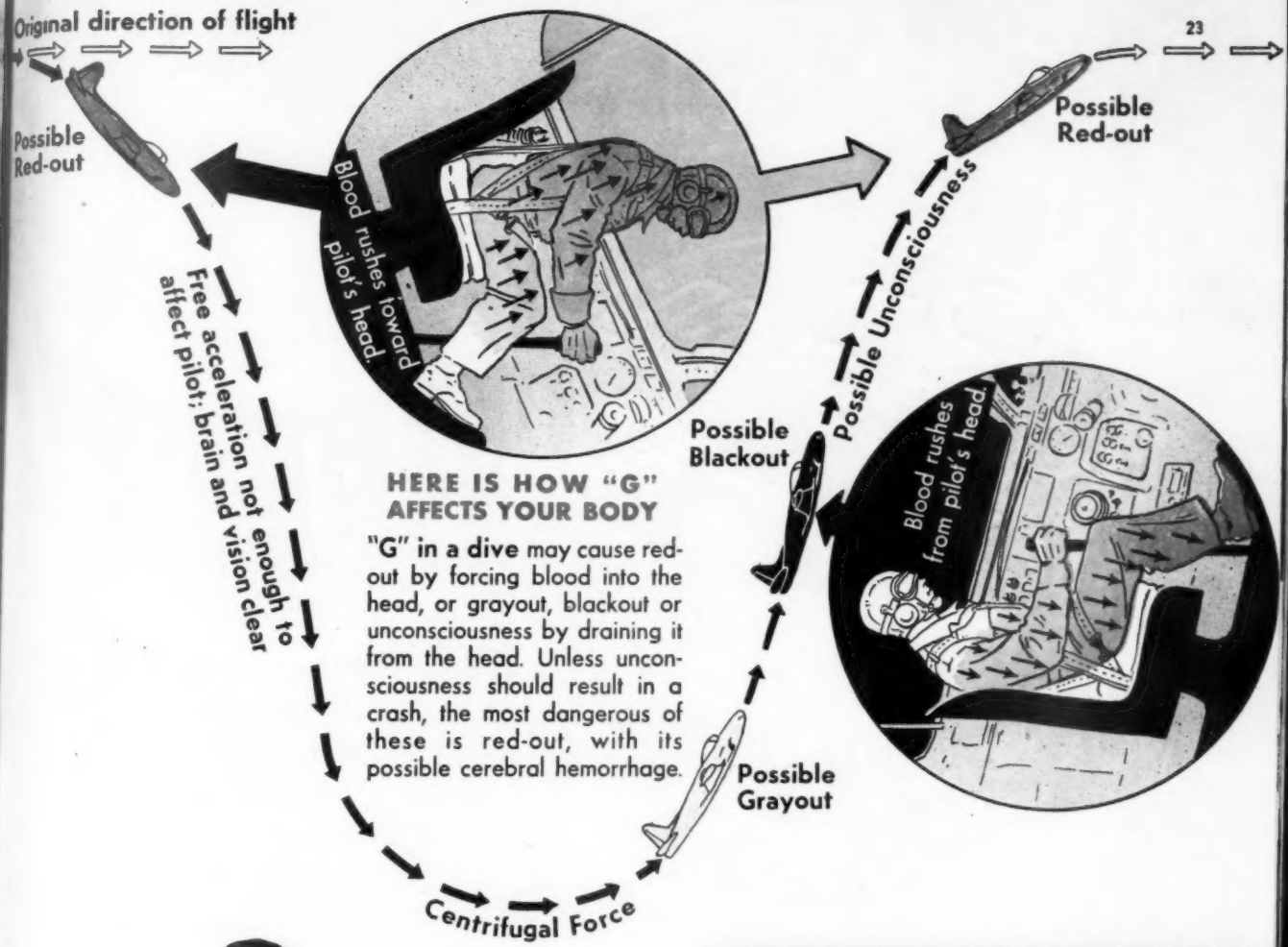


Straight-line acceleration is illustrated here. When elevator accelerates man feels heavier, when it decelerates he feels lighter. If he were standing on a scale, it would register heavier or lighter.

Each Turn Produces 5G



Change of direction, as in a tight turn, produces the only kind of "G" which affects pilots materially. The number of "G's" depends on a combination of speed and the radius of the plane's turn or dive.

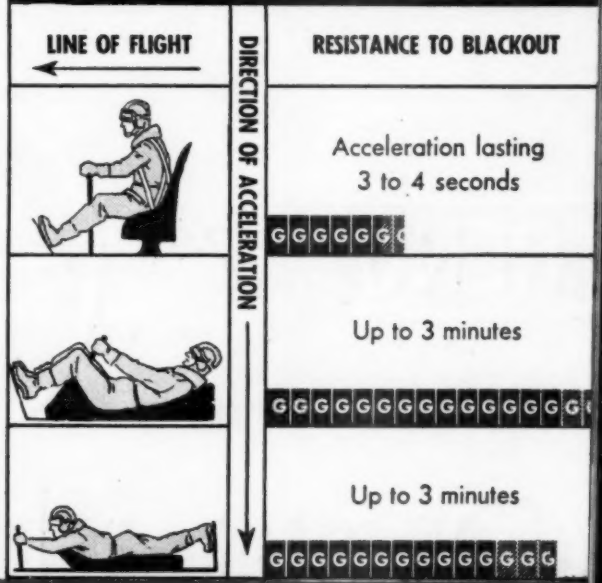


HERE IS HOW "G" AFFECTS YOUR BODY

"G" in a dive may cause red-out by forcing blood into the head, or grayout, blackout or unconsciousness by draining it from the head. Unless unconsciousness should result in a crash, the most dangerous of these is red-out, with its possible cerebral hemorrhage.

HOW CAN WE BEAT "G" ?

EFFECT OF POSTURE ON BLACKOUT


LINE OF FLIGHT
DIRECTION OF ACCELERATION
RESISTANCE TO BLACKOUT
Acceleration lasting 3 to 4 seconds
G G G G G G
Up to 3 minutes
G G G G G G G G G G G G G G G
Up to 3 minutes
G G G G G G G G G G G G G G G

Resistance to "G" can be improved in two ways. One is to wear a G-suit which has inflated bladders about legs and trunk to oppose the pooling of blood draining from the head. G-suits increase resistance to blackout by more than 1G. The other method is to assume a prone position, as indicated above.

Marker on Rockford, Ill., gas tank was promoted by the Women's National Aeronautics Association.

INDICATES AIRPORT WITH HARD-SURFACED RUNWAYS.

SEAPLANE BASE IS ONLY SEVEN MILES THIS WAY.

AIRPORT DIRECTION MARKER.

LATITUDE, LONGITUDE AND NORTH ARROW ON AIRPORT HANGAR

NORTH ARROW AND LOCATION.

WHO'S TO PAY FOR AIR MARKING?

Only the Federal Government can mark our aerial highways properly, says this Congressman.

DURING the war about 30,000 air markers were obliterated for security reasons or have since deteriorated into uselessness. This was unavoidable, certainly, but the fact remains that after 10 years of talking about air markings we are about where we were when we started.

Since the war, talking has been going on in an intensified fashion—and still nothing has happened. Security restrictions have been off in most parts of the country since August, 1944, and it has been more than a year since they were lifted for the entire country

But where are the air markers?

After considering the progress to date, and the great importance of this matter, I believe that Congress should immediately appropriate $5,000,000 for a five-year program of air marking. The appropriation should be passed soon enough to permit work to go forward on air-marking the nation this summer.

Let us review the air marking program to understand why I have come to this conclusion. When restrictions on air markers were lifted more than a year ago, all interested parties went to campaigning to restore the old markers and make new ones. The CAA, which has favored markers for 10 years, started an intensive publicity campaign. Joining with them, or conducting campaigns of their own, were almost any aeronautical organization you care to name, civic groups, state aviation leaders, oil companies and individual pilots. Oil and insurance companies sent out 18,000 reprints of the CAA Air Marking Bulletin authored by Blanche Noyes, CAA airmarking specialist, who has flown approximately 1,000,000 miles to make more than 2,500 speeches pleading for air markers.

Intensive, concentrated campaigns were carried on by the states. Last year in Kansas, for instance, there was an Air Marking Week. Civic clubs, newspapers, radio stations, the Army, the Navy and Civil Air Patrol combined to conduct an all-out drive for a marker for every town in the state. There were luncheon meetings, special broadcasts and special committees. When it was all over there (*Continued on page 72*)

By Hon.
RICHARD F. HARLESS

U.S. Congressman from Arizona, Mr. Harless is one of the most air-minded men in the House. He campaigned in an airplane in 1944 and is a founder and member of the board of the Congressional Flying Club. Congressman Harless has more than 50 hours of solo flying.

THE scoffers call it Marchev's "Folly." Some of them still don't believe a 215-h.p. amphibian can be sold for less than $8,000. They still doubt that its tag is $3,995, though Alfred Marchev, president of Republic Aviation, has repeatedly stated that that is the price, and more than 6,000 customers have their orders in. The conservatives die hard. They don't believe it, even though production *Seabees* are rolling off the assembly lines.

The scoffers don't know Alfred Marchev. They don't know how Republic's engineers have sweated over the drafting boards and strength tests to design a plane that truly can be mass-built. They don't realize how cost-conscious engineers can really simplify airplane construction when the heat is on.

The first *Seabee* was designed like any other plane, with stringers, ribs galore, braces, thousands of rivets. It had over 1,800 airframe

Assembling Seabee, workers join sub-assemblies completed in other shops. Window frame being installed is single sheet of heavy metal shaped by press.

Exploded view of Seabee shows the major assemblies of the amphibian. Production methods have been simplified radically to cut down construction costs. Workers (right) form hull section in a jig.

parts and took some 2,500 manhours to assemble fully.

When you figure on putting together 1,800 pieces to make a plane, its cost is bound to be high. But Marchev didn't figure on doing that. He told his engineers how much he wanted to build the *Seabee* for and told them to design for that cost. Those who said it couldn't be done he fired; a lot of engineers got fired. But those who stayed on found it could be done. The payoff is a radical production job which may revolutionize plane building of the future.

Ideas that plane builders have been using since the Wright Brothers went out the window. Marchev's designers took a good look at Detroit. No reason why you can't pick up some good ideas from the masters of mass-production, the auto builders, they thought, and they were right.

The *Seabee's* engineers, of course, had sam-

Seabee's wing built by conventional methods would take 280 manhours, but simplified version built by these workers takes a fraction of that time.

Marchev's 'Folly'

Seabee's radical design confounds the diehards who claim "it can't be done."

Completed Seabee is a four-place amphibian, will sell for $3,995 at the factory. Manufacturer says plane would cost $8,000 if built by conventional construction methods.

Alfred Marchev (inset), Republic Aviation president, oversees simplifying of Seabee. Photographs (below) show how careful design reduced manhours and parts on stabilizer.

pled large-scale plane production by building thousands of *Thunderbolt* fighters during the war. But the *Thunderbolt* had a conventional structure. A lot of it was complex and handmade. It was a long way from building an automobile. But the *Seabee* is different. It is stamp, scrimp, clamp, eliminate, cut corners.

The old plans were laid on the drawing boards again and the draftsmen used erasers by the pound. One thousand three hundred and fifty airframe parts were eliminated. The remainder were beefed-up. Factory tooling costs were cut from $1,750,000 to $400,000. Labor hours were whittled to 200 hours per finished plane.

At this writing, the simplified *Seabee* has yet to get its CAA Approved Type Certificate, but Marchev's men claim that it has passed all CAA strength and stress tests—some by more than 300 per cent.

By the time this is published, 40 completed *Seabees* a day are supposed to roll from the assembly line, although construction started only in May. At that rate it will take at least 125 working days to supply the orders now on hand.

The completed *Seabee* is naturally no "bench job," where workers lay the keel and then proceed to build an airplane upon it. Instead it has been broken into 24 major units which are completed separately and then are brought to the main floor for assembly.

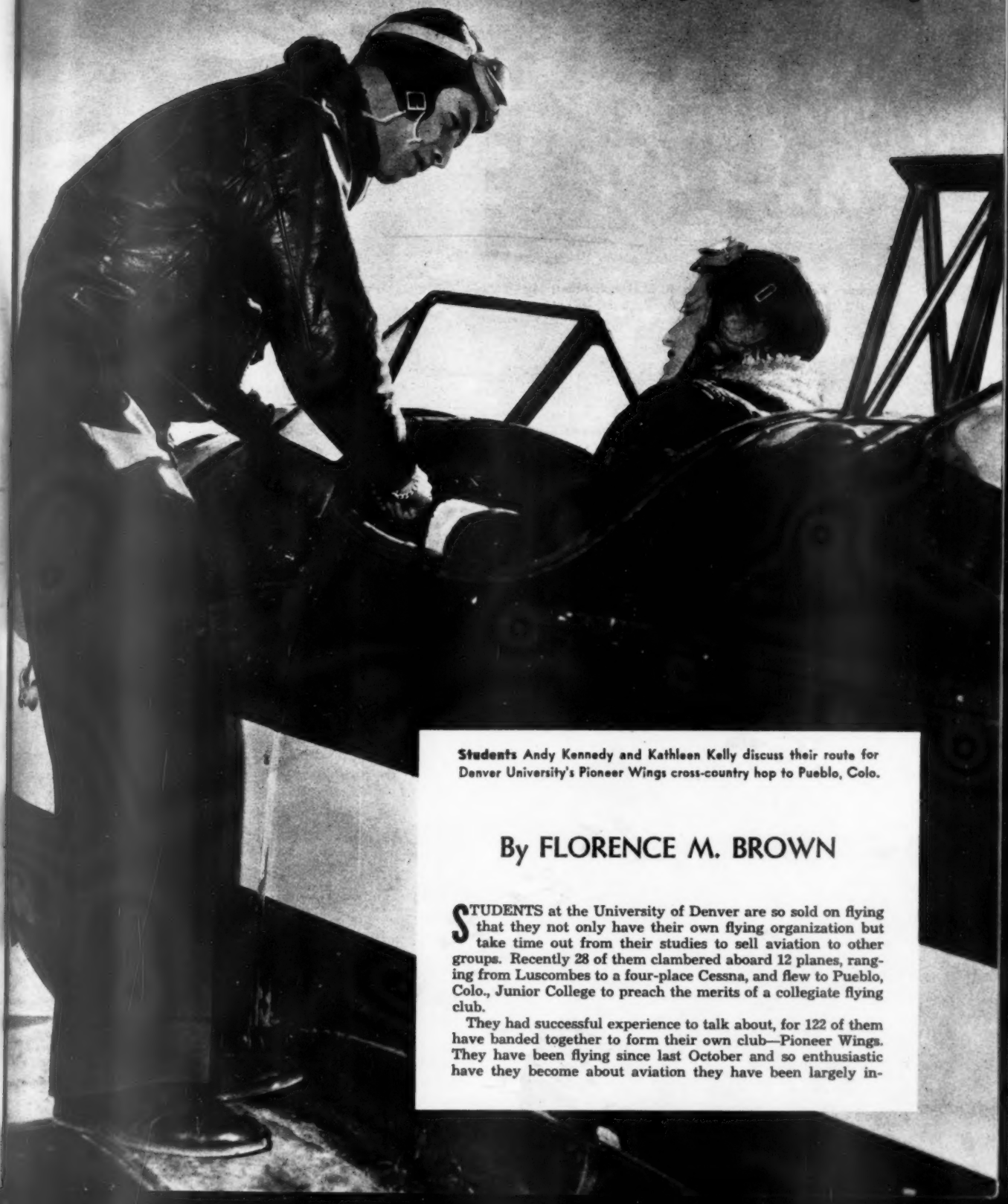
Each unit has been simplified amazingly. The original wing required 114 parts, 2,627 rivets, weighed 150 pounds and took 280 manhours to construct—more manhours than it now takes to build the entire airplane.

The draftsmen erased nine ribs, all of the stringers, added another spar and eliminated enough pieces to bring the total of their new design to but 30 parts. This simplified version weighs 110 pounds and takes 882 rivets.

Applying the wing covering of the *Seabee* is another radical departure. Instead of using many small pieces riveted together more or less in a patch-work quilt, construction calls for a few pieces which fit down over the framework like a glove. Very few rivets are needed to attach these large pieces (*Continued on page* 102)

College Flight Club

Denver students combine pleasure flying with job training.



Students Andy Kennedy and Kathleen Kelly discuss their route for Denver University's Pioneer Wings cross-country hop to Pueblo, Colo.

By FLORENCE M. BROWN

STUDENTS at the University of Denver are so sold on flying that they not only have their own flying organization but take time out from their studies to sell aviation to other groups. Recently 28 of them clambered aboard 12 planes, ranging from Luscombes to a four-place Cessna, and flew to Pueblo, Colo., Junior College to preach the merits of a collegiate flying club.

They had successful experience to talk about, for 122 of them have banded together to form their own club—Pioneer Wings. They have been flying since last October and so enthusiastic have they become about aviation they have been largely in-

Members (l. to r.) A. J. Schmidt, R. M. Lloyd, Albert Minton, J. J. O'Neill, W. A. Jones and Tom Eagleson are veterans.

Parked planes line the apron at Skyranch before take-off of mass flight. Twelve student-flown planes made the 105-mile hop.

Luscombe taxis toward take-off runway as all-student flight gets under way. A 30-m.p.h. headwind slowed flight to Pueblo with planes averaging 70 minutes flying time for the 105 miles. Students flew at 1,500 feet.

strumental in getting the university to install two flight training courses—for credit—in its curriculum.

The members had plenty to talk about, therefore, beside their own accident-free operation. They took off from Pueblo at 8:30 one morning with faculty-member guests and flew the 105 miles in a little over 70 minutes, slowed by a 30-mile headwind. Their average indicated altitude was 1,500 feet—which in Colorado's mountainous country means 7,000 feet above sea level.

A delegation from the junior college was on hand to greet them at Pueblo Municipal Airport and escort them to the school's assembly hall. Here were 225 Pueblo students who heard the members of Pioneer Wings extol the benefits of college flying clubs. So effective were their arguments that the Pueblo students have organized their own club.

Pioneer Wings was organized by a 24-year-old ex-GI, Albert Minton of North Wilkesboro, N.C., who now is club president. Although club activities are entirely independent of school curricula, its effect on the university's flying courses is indisputable. Not all members of the club are enrolled in the college training program. Minton, for example, is a law student. Nevertheless, members of the club see their aviation experi-

Bobby sox and flight gear mixture seems commonplace with Pioneers.

Welcoming committee head, Kenton Darr, greets Mrs. La Rene Ramsey, faculty sponsor of Pioneer Wings, at Pueblo airport. Girl in Cessna's cabin is Jo Montgomery, club secretary. Fairchild Cornell (below) was first student-flown plane to complete the flight from Denver to Pueblo.

ences as a substantial aid in post-war jobs in aviation. The university-sponsored course leading to a private license costs $327, and the 167-flying-hour commercial course costs $1,356.75.

In addition to time flown in the school program, Pioneer Wings members average about an hour a week in the air at Skyranch Airport, where they pay $5 an hour solo ($10 dual) for lightplanes. Larger planes available for flight training at Skyranch include a Boeing *Kaydet,* two Fairchild *Cornells,* a four-place Waco, and a four-place Cessna. Minton, who has a *Cornell,* is the only plane-owning member.

A good many club members have extensive flying experience. Sixty-five of the men are veteran Army or Navy airmen. A. J. Schmidt and R. M. Lloyd, both former bomber pilots in the AAF, each have more than 2,000 hours, and a number of other club members have over 1,000 hours. Minton, a one-time enlisted aerial photographer, has logged nearly 1,000 hours as a private pilot since 1939.

There are 67 co-ed members, of whom Charlotte Towne, vice-president, has flown the most—50 hours in lightplanes. Club activities are continuing even during summer months. Minton explains the club's attitude in this way: "hot pilots or beginners, we're all in it for but one reason—we love to fly!" END

Picture display of Pioneer Wings activities is explained to Pueblo college students by slack-clad Charlotte Towne.

Six Pioneer Wings' lightplanes form up over airport for flight home from Pueblo Junior College. Below, club president Albert Minton props an Ercoupe before take-off. In cockpit is Max G. Houtchens, faculty member and guest on flight. Purpose of the trip was to provide students at Pueblo Junior College with practical tips on how to organize their own flying club at the school.

Stockholm window advertisement for air taxi service draws Miss Beit's attention. She decides to charter an air taxi to her home.

Swedish Taxi Flight

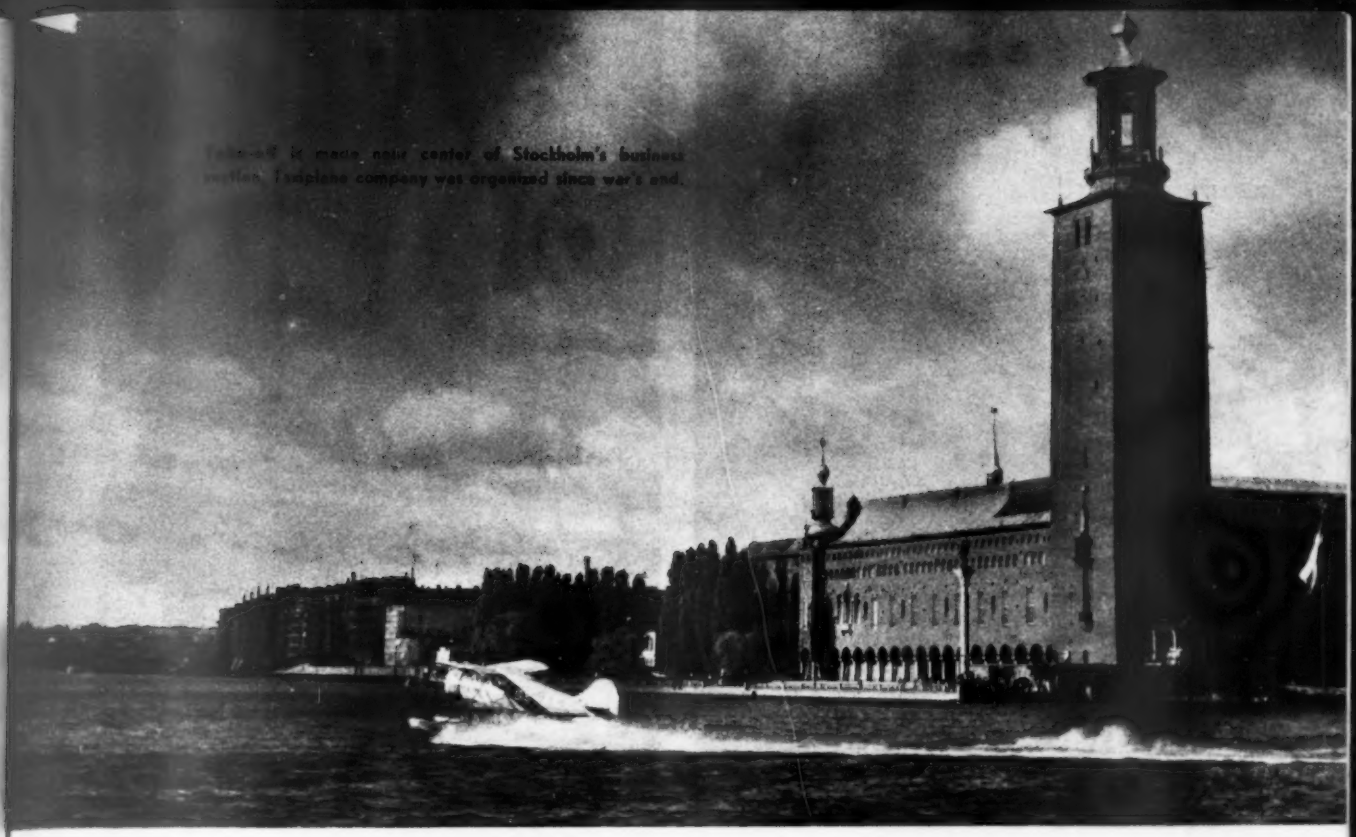
Ulla Beit, a Stockholm office girl, hires a taxi plane for a flight to her parents' home on a tiny island in north Sweden.

IN EUROPE, where train service never has equalled that expected by the average U. S. citizen at home and where the airlines do not run on a large scale, the flying taxi service comes into its own. Especially is this true in Sweden where rural homes often are scattered along twisting coast lines.

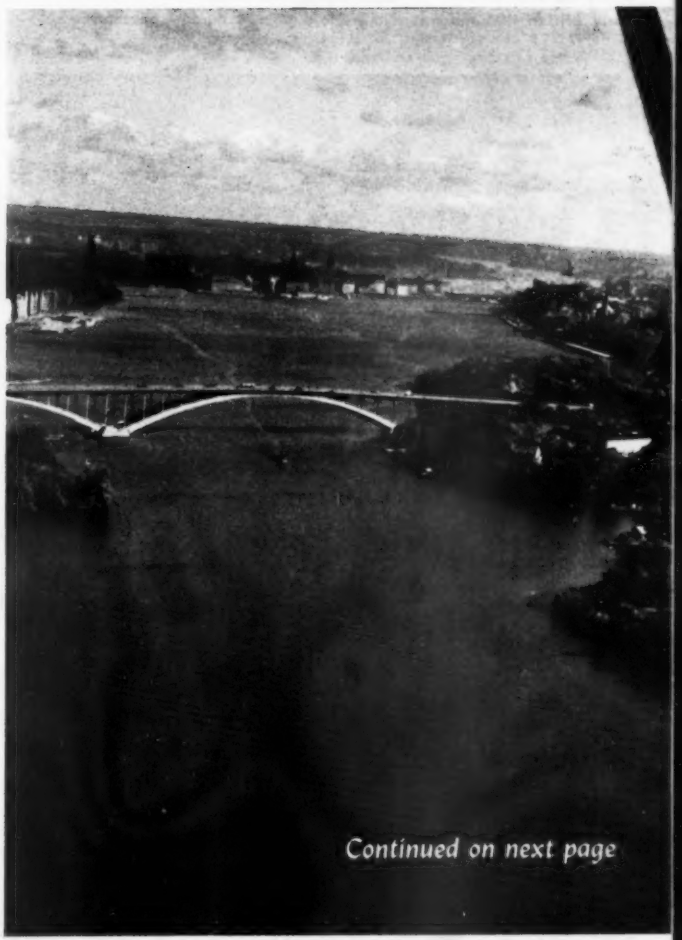
Miss Ulla Beit of Stockholm is typical of the passengers. She wanted to visit her parents for a day, but they lived on Ridoe Island in the middle of Lake Maelaren. The nearest railroad town is a long boat trip from her parents' cottage.

Ulla splurged for the airplane; it cost her nearly $80. By train, the round trip would have cost $6. But it would have taken five hours, plus a lengthy boat ride. The aerial round trip took two hours.

Ulla shows pilot her destination on his flight chart. She had previously phoned taxi company and ordered taxiplane to meet her.



Conversation enroute makes time pass swiftly. Pilot informs Ulla that taxi company charters hops to Lapland, Norway and Denmark.



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Stockholm's harbor passes under the wings shortly after take-off. Most flights are over water and taxiplanes use floats in the summer.

Family on pier waves at plane bringing Ulla home. She had previously written that she was flying. Note plane's shadow on shore.

Ulla's father welcomes daughter home a little over an hour after she left Stockholm. Plane is four-place Waco, cruises at 105 m.p.h.

Coffee and cakes are served daughter and her pilot in family dining room. This was first time in months that Ulla had eaten at home.

Waving farewell, Ulla and pilot leave early. Her $80 bill would have been smaller if taxiplane had been carrying more passengers.

Report from Washington

By FRED HAMLIN

HOW important eye-sight is to the average pilot is a question currently getting a thorough going-over at Ohio State University. Financed by the National Research Council, expert eye specialist are in charge of the work . . . Inspiration for the tests is Dr. Dean R. Brimhall, head of research at the Civil Aeronautics Administration, who for years has pioneered the idea that it does not take Superman to fly and that many of the pilot tests—including eye tests are either inefficient or have nothing to do with flying ability. . . . The Ohio experiments involve some 200 student pilots divided into four visual classifications: excellent, good, fair, and lousy. All students are taking the same—standard—beginner's flight course, and all are being checked to determine their progress, regardless of eyes. . . . Final results will not be available until this fall, but we're told that most students are coming along fine. Matter of fact, some of the students with bad eyes are turning out better than average.

Age Groups

To Dr. Brimhall we also are indebted for some revealing figures on the age of persons who are flying lightplanes these days. Believe it or not, it's still a very young man's game. . . . Sixty-three per cent of the student and lightplane pilots during 1945, the figures indicate, were less than 30 years old, 45 per cent were less than 25. Here is the breakdown:

Aged 17-19	22 per cent
Aged 20-24	23 per cent
Aged 25-29	18 per cent
Aged 30-34	14 per cent
Aged 35-39	10 per cent
Aged 40-44	6 per cent
Aged 45-49	3 per cent
Aged 50-54	2 per cent
Aged 55 and up	2 per cent

From the field, however, we have received word indicating that, while older flyers are fewer, they are buying more planes than the youngsters. "The average ages of *Ercoupe* purchasers," C. C. Moseley, president of Grand Central Airport Co., Glendale, Cal., reported after a survey recently, "are from 30 to 45 years. This group is older than the people who formerly purchased airplanes——the majority being around 40 years of age." The survey represented approximately 300 purchasers of *Ercoupes* in California.

New Chairman

Causing more excitement around Board headquarters these days is the impending arrival of the new chairman, James M. Landis, former law clerk to Justice Brandies, Chairman of the Securities and Exchange Commission, Dean of Harvard Law School, head of the Office of Civilian Defense, and member of the Federal Trade Commission. Feeling is that he should make an able addition to the five-man Board team, and this despite universal regret that Welch Pogue resigned. Pogue will practice law in Washington. . . .

The line-up will now find Oswald Ryan, one of the original CAB members, as vice-chairman; Harllee Branch, another old-timer who has been both chairman and vice-chairman in his day, member; and Josh Lee and Clarence Young filling out the roll. . . . You may be as curious

James M. Landis, former OCD head, is new Civil Aeronautics Board chairman.

as we were why Harllee Branch didn't turn up as chairman or, at least, vice-chairman. We understand that the reason is simple: he wouldn't have either job, and no hard feelings. He believes that he is of more value as a member, a post in which, incidentally, he has done an outstanding job. Another thing, he hates publicity—including, we'll bet, this. . . . One more curious item we picked up was that the new chairman was born, of all places, in Tokyo. But don't let it worry you—both his parents were Americans.

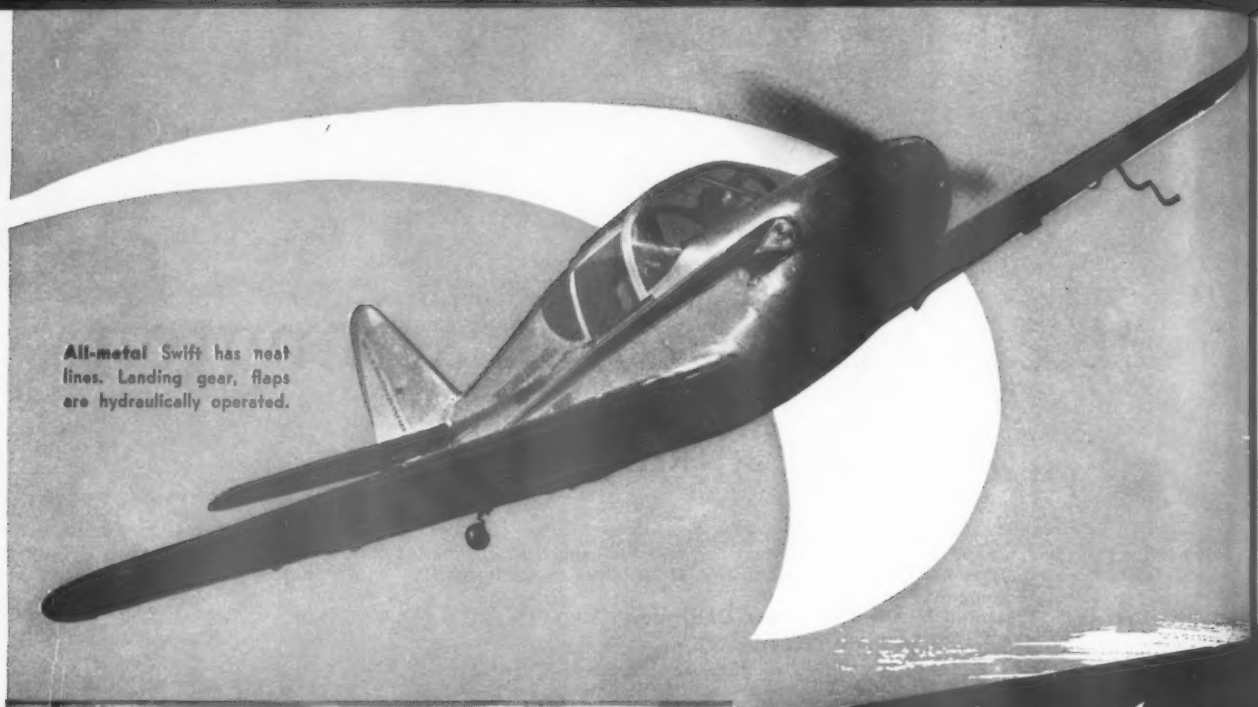
Feeder Pay-Off

As was predicted here last month, the Civil Aeronautics Board has sped up its feeder lines decisions, with four franchises already approved as this goes to press, and decisions on a dozen more promised before the end of the summer. All certificates granted are for three years only, with a warning from the Board that the local airlines will have to pay their way against stiff ground competition, hence must not count too heavily upon mail subsidies to break even. . . . The Board was frank in admitting that it couldn't guess how the little lines will make out. Skepticism was expressed as to whether the admirable enthusiasm of civil groups in small communities would be matched by cash customers as passengers on the lines. "Despite the boundless enthusiasm shown by the cities to be on the air map of the country," the Board stated, "the tickets will be paid for by individuals, each acting on his own judgment as to whether he can reach his destination more conveniently by the train, the bus, private automobile, or the airline. Civic pride will not enter into that decision. We cannot emphasize too strongly therefore that the carriers authorized to operate such services will be expected to be on a constant search for methods of achieving economies in operations."

Bright Future?

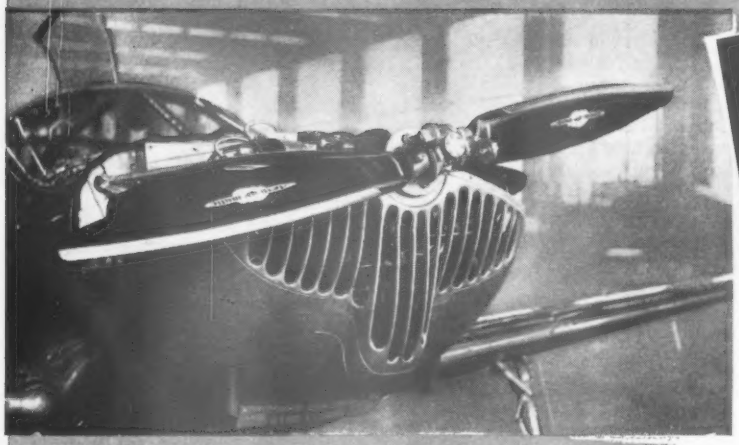
With these precautions underlined, concensus inside the Board seemed to be that the little lines, especially in remote areas and mountain country, have a better-than-even chance of making good in the three-year trial period allotted them. Although their progress will be watched with more-than-ordinary interest, no special Board checks are being set up on the feeders. They will file monthly reports just like the big lines and will work under the same regulations. . . . The Board has indicated, however, a tendency to favor enterprising use of new equipment

(*Continued on page* 90)



All-metal Swift has neat lines. Landing gear, flaps are hydraulically operated.

THE *Globe*



Aeromatic propeller for 85-h.p. engine is now installed in Swift. When plane was first constructed, Aeromatics were unobtainable and Beech units for 65-h.p. engine were used. Flight performance is better with Aeromatic.

Swift's instruments match overall cockpit design and give attractive appearance. The crank is control for Beech propeller. Aeromatic propeller is constant-speed type, has no crank. The radio is extra equipment.

e Swift

FEW post-war lightplanes have excited as much interest as the Globe *Swift*. Its advance publicity and advertising promised an airplane that many pilots had sought for years. So it was with a more-than-average interest that I visited the Globe plant in Fort Worth recently to test-fly a production *Swift*.

Unfortunately, I was only able to fly one of the early production models, equipped with a manually-controlled Beech propeller. I flew this airplane—NC-80551—for more than an hour, putting it through every possible maneuver except spins, which are forbidden by a CAA placard riveted to the instrument panel.

This placard, plus the fact that Globe officials decided to use the Beech propeller on its first airplanes (the Beech propeller currently on *Swifts* was designed and manufactured for 65-h.p. engines, not the *Swift's* 85-h.p. Continental), have been largely responsible for the failure of the first models of this plane to live up to expectations. Those two drawbacks, then, should be carefully examined.

First, the placard is there because the *Swift*, with its present tail, will not recover from a spin within the minimums required by the CAA. This probably is due to the size of the present tail surfaces; they have already been redesigned and production models of the *Swift* in the near future will have a new, larger tail. This should eliminate the placard.

Secondly, the present Beech propeller should not have been installed on production *Swifts* at all. But Globe had a lot of airplanes finished except for propellers, could not get Aeromatics (specified in the design), so bought a bunch of the 65-h.p. Beech units. Recently, *Swifts* began coming through with Aeromatic propellers.

As I have said, I had to fly an early *Swift*—but one that was typical of those being delivered to customers—at the factory. Its per- (*Continued on page* 104)

FLYING's TEST PILOT

EDITOR'S NOTE

This is the third article in a series designed to help the pilot and prospective airplane owner evaluate aircraft now on the market. The airplane manufacturer usually supplies the plane to be tested, but has no control over the opinions arrived at or published here. Readers are encouraged to comment on this new feature.

Early Swift's clean lines will be retained, but later models will have larger tail to improve the spin characteristics.

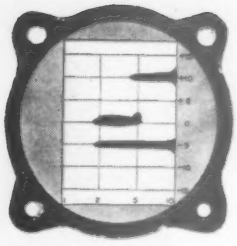
THIS EQUIPMENT COULD PROVIDE AUTOMATIC FLIGHT

CONSTANT AIRSPEED

An ordinary airspeed indicator can be linked electronically to the autopilot to fly the plane at a constant pre-set airspeed.

CONSTANT ALTITUDE

A pressure altimeter properly hooked up to the autopilot's computer assures the plane of flying at a constant altitude.



COLLISION WARNING

Electronic signals from CAA collision indicator fed into autopilot can fly the plane on a course to avoid danger.

THE AUTOMATIC PILOT

The autopilot is basic to automatic flight. Through the dials on the control panel, it can fly the plane. Without dials, the electronic "brain" behind the control panel can interpret signals from the flight instruments illustrated here and actuate the controls.

AUTOMATIC NAVIGATION

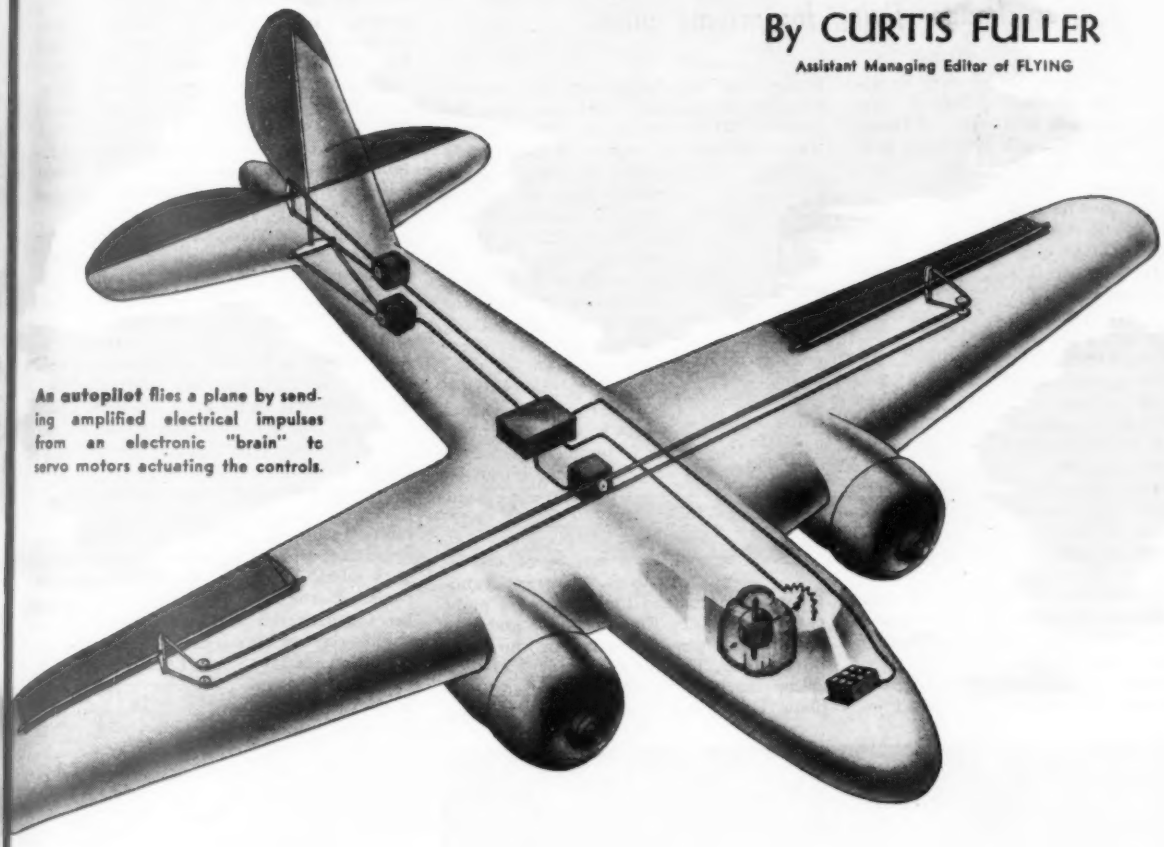
A radio compass can be linked with the autopilot so that the plane will "home" on any radio station to which it is tuned.

AUTOMATIC LANDIN

Automatic approach coupler fly plane down the CAA loca and glide-path beams used in conventional blind-landing syst

Flight without Pilots

By CURTIS FULLER
Assistant Managing Editor of FLYING



An autopilot flies a plane by sending amplified electrical impulses from an electronic "brain" to servo motors actuating the controls.

The instruments of automatic flight are here. Now they need only to be manufactured in quantity.

PUSH-BUTTON flight is here. Before long you will jump into your own plane, twirl a few knobs, push those essential buttons, and take off. You will climb, fly at a fixed pre-set altitude on a fixed pre-set course, proceed at constant airspeed, and land—all automatically and with no other flying effort than an occasional visual check.

Flying has gone automatic and a few years hence, fool-proof push-button equipment should be available for your personal airplane for a few hundred dollars. The entire installation will weigh no more than 20 pounds.

Automatic flight means a revolution in private flying, for if it is fool-proof, all flight problems become safer and easier. If it is weather-proof, uninterrupted schedules to closed-in airports become a reality for the first time.

Oddly enough, the equipment to create automatic flight is already here and has been tested and proven in detail, but only in a couple of cases has it all been assembled together. It needs development, of course, but that will come naturally in the next few years. Essentially, the most pressing need is for the components to be linked together and manufactured. And when that happens, and automatic flight equipment is produced cheaply enough and marketed widely enough, it will turn a weather-bound gadget—the personal plane—into a 98 per cent useful means of transportation. At one stroke it may solve the problems of navigation, of precision flying, of fog, of blind landings, of fatigue, or mid-air traffic control, with which private flying is so beset. With it, the novice has the skill of a commercial pilot. It will even do some of the pilot's thinking for him. It will not underwrite his flying judgment but it can guarantee his skill.

The basic developments which make automatic flight possible have grown out of the war. Most important is the electronic automatic pilot, (*Continued on page* 78)

Lightplane Diesel

By GILBERT C. CLOSE

First Diesel engine for small aircraft may offer cheaper flying for private pilots.

THE first lightplane Diesel ever developed is the brain child of Fred A. Thaheld, aeronautical engineer and Diesel expert. Thaheld's name has been synonymous with aircraft Diesels for years. Back in the late 1920's he was developing one of the first Diesels to be produced. He followed this by the well-known Guiberson Diesel A-1020, a nine-cylinder radial job that, while not widely accepted for aircraft use, proved its stamina and reliability as a powerplant for tanks during World War II.

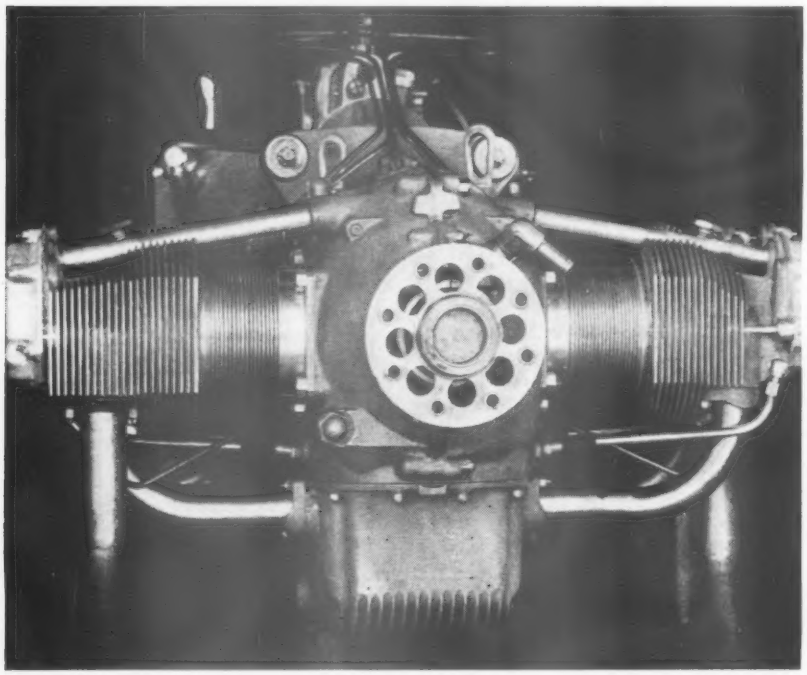
Fred A. Thaheld

Two prototypes of the new lightplane Diesel have been produced to date, of 100 and 125 h.p. respectively. The prototypes are identical in design and construction, with all component parts interchangeable except for a slight modification of the fuel injection system.

The engine is of conventional horizontally-opposed air-cooled design—and intended for installation on the average two- or three-place lightplane cruising between 90 to 130 m.p.h. Total engine weight without accessories is 235 pounds, giving a weight-horsepower ratio of 2.35 for the 100-h.p. model, and 1.88 for its 125-h.p. counterpart. This compares favorably with ratios of gasoline engines in the same power brackets.

The outstanding feature of the engine from the private pilot's standpoint is operational economy. Fuel consumption at normal cruising speed is approximately .20 lb. per h.p.-hour. Fuel grade is Min. 50 cetane re-refined Diesel oil meeting Army and Navy specifications. Current retail selling price of the fuel is around eight cents per gallon. Fuel costs are about 10 per cent of gasoline costs for the same horsepower, Thaheld claims.

Constructional dimensions of the lightplane Diesel are comparable with gasoline engines of equal size. The bore is 4⅞ inches and stroke 3⅞ inches, giving a total cylinder displacement of 290 cubic inches. Compression ratio is 16 to 1. One exhaust valve and one intake valve per cylinder are operated by an overhead rocker assembly. The valve seats are replaceable.



Thaheld engine emphasizes advantages of Diesels. Fuel injection system eliminates carburetor icing hazard. Engine needs no ignition system, uses a cartridge-type impulse starter.

Despite strength requirements brought about by the high compression ratio, the cylinder heads are of aluminum. The pistons are full strut aluminum, with conventional I-beam connecting rods and bronze-backed, babbitt-faced, connecting rod bearings. The thrust bearing is of aluminum. The cylinder barrels are of steel and the crankcase of cast aluminum alloy. In production models, Thaheld intends to utilize the magnesium alloys wherever applicable to reduce engine weight further.

The lubrication system is of the dry sump type, with a two-gallon oil capacity. Oil consumption per hour compares favorably with gasoline engines of equal power. The prototype engine, now installed in a Stinson 105, was given a 700-hour block test, then completely disassembled and all wearing parts checked. The wear was found to be nominal in all cases and, in certain instances, less than would be expected from a conventional gasoline model.

The most marked improvement of Thaheld's new lightplane Diesel over previous aircraft Diesels is in operational characteristics. The engine starts easily, both when cold and after short stop periods. Despite the high compression ratio, the propeller can be turned and the engine started by hand. The current installation on the Stinson utilizes a Coffman cartridge-type impulse starter and acceleration of the engine is so rapid that the ear cannot distinguish the interval between the report of the starter cartridge and normal ground idling speed.

Warm-up after starting is limited to the time required for moving parts to expand to normal operating dimensions. This period is somewhat shorter than for gasoline models, where warm-up periods include raising induction system temperatures to minimum levels. Also, because no induction system warming is necessary to obtain proper vaporization of the fuel charge, as with gasoline engines, the Diesel operates smoothly from the first power stroke.

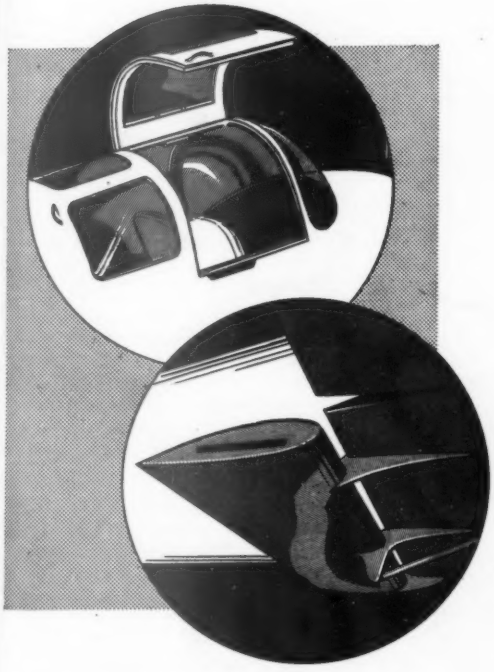
Though no altitude records have been attempted as yet with Thaheld's new Diesel, it is an established fact that substituting Diesel power for gasoline power automatically raises the ceiling of an airplane some 40 per cent.

Thoughtful consideration was given ease of servicing during design of the engine. After removal from the airplane it can be completely disassembled in two hours and assembly can be accomplished almost as quickly. This feature will reduce time costs during major overhauls substantially. The absence of critical ignition and carburetion systems will cut down maintenance costs and eliminate many trouble sources common to all gasoline models.

The fuel injection system as a whole is

(*Continued on page* 98)

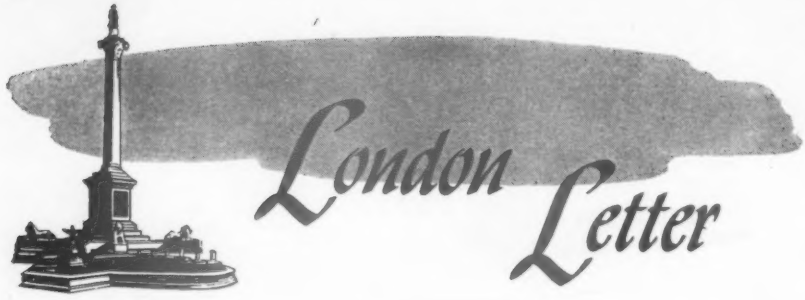
The Gemini, although it has two 100-h.p. engines, closely resembles its sister plane, the single-engined Miles Messenger.



Cabin hood of the Gemini (top) is balanced to remain in any set position while plane is on ground. Below, detail of the electrically-operated flaps which help give the plane a low landing speed.

THE *Miles Gemini*

THE *Gemini* is a new British four-place airplane which has no U.S. counterpart. Its two 100-h.p. *Cirrus Minor II* engines give it a maximum level flight speed of 150 m.p.h. and cruise it at 130 m.p.h. It stalls at only 35 m.p.h. and single-engined performance is reported to be "satisfactory" at medium loads. The *Gemini* weighs 1,910 pounds empty, 3,000 pounds fully loaded. Fueled for maximum range of 820 miles, payload is 662 pounds; normal payload is 764 pounds. Span is 36 ft. 2 in.; length 22 ft. 3 in.; wing area 191 sq. ft.; rate of climb 870 f.p.m.; distance to clear 50 feet in five-m.p.h. wind 930 feet. Landing run in five-m.p.h. wind is 375 feet. Landing gear on production models will retract electrically, and present Miles high-lift flaps, now mechanically operated, will also be actuated by electricity to give it its low landing speed.



By Maj. OLIVER STEWART

British Authority, Editor of Aeronautics

MANY believe that it will be easier to coax young people to buy personal aircraft if the rudder bar, or rudder pedals can be eliminated. Hands-only flying control not only would be easier, according to this argument, but it would also leave the floor of the cockpit clear.

But British ideas of how hands-only control should be arranged differ from American and French. The linkage of ailerons and rudder is looked upon with suspicion here in England. It is felt that the pilot must have the power to move either the rudder, or the ailerons, independently.

The manufacturers of the Chrislea *Ace*, three- to four-seat light aircraft, believe that they have solved the problem. They believe that they have found the best way to provide hands-only control and yet give the pilot the power to move rudder or ailerons independently.

Essentially the difference between the controls of the *Ace* and those of American and other personal machines lies in the way the hand wheel is moved. There are no rudder pedals or rudder bar, only a wheel. And the column on which the wheel is mounted does not come up from the floor but out from the dash. But if the pilot wants to raise the elevator and increase the angle of the aircraft he lifts the wheel instead of pulling it back. If he wants to lower the elevator and decrease the angle of the aircraft he lowers the wheel instead of pushing it forward.

Side-Slips

That is the only fundamental difference. But it leads to extremely important differences in other directions. For instance, if the pilot wants to yaw the aircraft by applying left rudder without at the same time applying any aileron, he can do it by moving the wheel to the left.

And if he wants to bank the aircraft without at the same time turning it he can apply aileron by turning the wheel in the required direction without applying rudder by moving it to right or left.

It will be seen that there is a basic difference between this British form of hands-only control and the forms that have been developed in the United States and elsewhere. And it will also be seen that the range of control offered by the British system is greater. It will be possible with the British system, for instance, to make controlled side-slips; or to make controlled flat turns.

The British system has not yet been fully tested. The first Chrislea *Ace* will not be flying until June or July. But if the system works in practice, your correspondent feels that it will represent an advance over any other.

Suppression of the rudder bar or rudder pedals is all very well. But suppression of the power to move the rudder independently of the ailerons is not so good. In the British hands-only system, the pilot will have a detailed command over his aircraft, yet will enjoy the advantages of a simplified means of applying it.

Original estimate for the price of the *Ace* was about $2,400 but that is with the *Monaco*, four-cylinder, flat engine. If that engine is not ready and a *Cirrus* is fitted, the price will go up by about $1,200 bringing it to $3,600.

British lightplane, the Chrislea Ace, offers hands-only control of rudder, elevators, and ailerons. Three- or four-place model will sell for $2,400 to $3,600, depending on engine used.

Transports

Successful first flights by the prototype Avro *Tudor II* (76,000 pounds) aircraft were followed by further criticisms of the plan to build the large *Brabazon I*. This is the 250,000-pound aircraft which is being built by the Bristol Company at Filton.

Special runway extensions will be needed to allow the *Brabazon I* to take off, and they entail turning a number of people out of their homes. The critics have, therefore, asked whether the scheme for building this large machine ought not to be scrapped. A decision has now been made by the Ministry of Civil Aviation and it is to go forward with the new aircraft.

The *Brabazon I* will have power-operated controls so that no aerodynamic balances or tabs will be needed. When the *Constellation's* power-operated controls were first studied over here there was opposition to the idea. But it has been diminishing. Arthur Gouge, vice-chairman of Saunders-Roe and president of the Society of British Aircraft Constructors, has always favored the all-electric aircraft with power-operated controls.

Air Training

The fate of the Air Training Corps has been causing some anxiety, for the corps had proved successful in stimulating the interest of young boys in aviation. Now it is known that the ATC is to become an integral part of the Royal Air Force. It is to be included in the newly-formed Reserve Command and its strength is to be 75,000.

It provides not only ground training but also a certain amount of air experience for its members. It was the avenue of entry into the RAF for a great many men during the war.

Civil Aviation Bill

When the Civil Aviation Bill was published on April 6 it was seen to contain little that was new. The bill is designed to give effect to the Labor Government's policy of nationalizing the British airlines

(*Continued on page* 102)

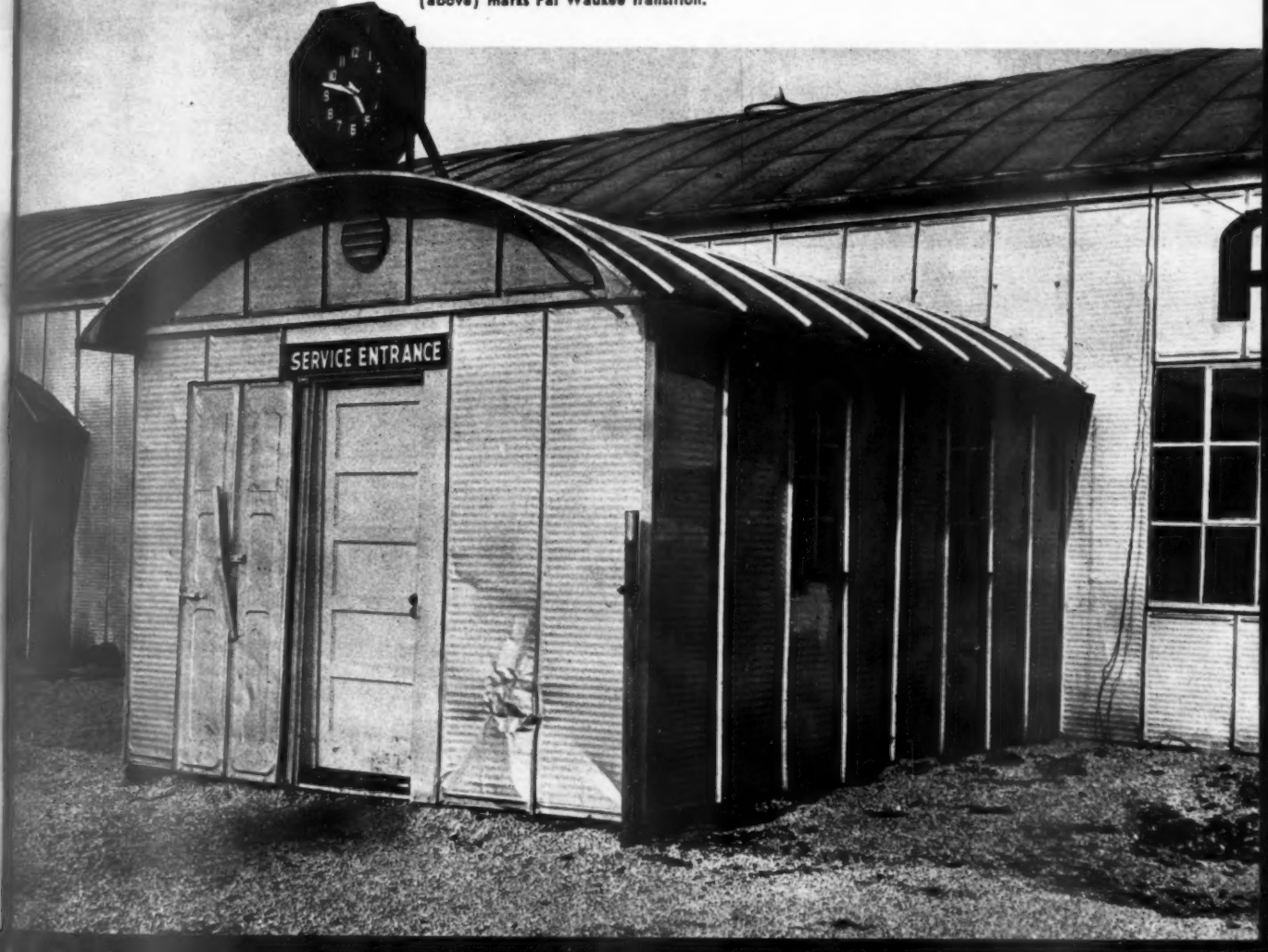
—One Year Later

ONE year ago, FLYING chose four airports in the Chicago area for a picture feature entitled "How Not to Run an Airport." The result was a furor among airport operators.

This year FLYING's photographer again visited the same airports. Airport A (Pal Waukee) has been taken over by Parks Sales and Service and cleaned up. Airport B (American) had been closed and sub-divided into building lots. Airport C (Rubinkam) was just acquiring new management.

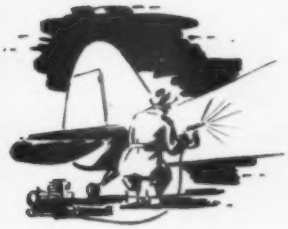
Airport D (Harlem)—included in the 1945 investigation but not shown at that time—has had two fires. Oddly, each fire was just a year apart, each destroyed a hangar and a number of planes, each occurred just before release of FLYING's reports on their operation.

Neatness (below) compared with filth (above) marks Pal Waukee transition.



Efficient now, this shop at Pal Waukee Airport was a cluttered mass of plane parts and rubbish in 1945. Ten truckloads of trash hauled away and less than $5,000 in improvements have changed its entire appearance. Costs were repaid in one month by additional business the clean-up attracted.

Disorder disappears when business methods are changed. These photographs, taken from almost exactly the same position at Pal Waukee Airport, illustrate how a broom, plasterboard and elbow grease can transform what was a sloppy hangar into one that's clean.

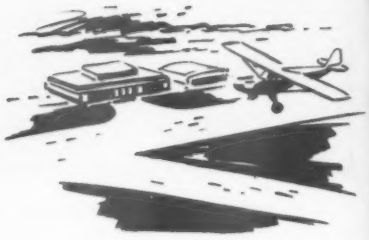


Cluttered confusion marked this corner at Pal Waukee Airport hangar. Floor was covered with oil, fire extinguisher was empty and blocked by heavy oil drums. Yet, planes were hangared in midst of debris.

Maintenance methods, FLYING's survey found, often depend on the field's operator. The photographs above and right were taken in the Pal Waukee hangar. Under old management, floor was grease-coated, engine crates and oil drums cluttered the concrete. The youth servicing Rearwin splashed oil over engine cowl. This contrasts sharply with present operations. Note that the hangar floor has been carefully cleaned; mechanics overhauling Cessna Bobcat (right) are uniformed.

Lockers and washbowl have replaced litter. Lockers were brought from other parts of hangar and neatly repainted. Trash was hauled away and usable tools stored. CO_2-type extinguisher is ready to use.

No change has been made in this littered washroom at the Rubinkam Airport since this picture was made last year. Operator refused permission for photo this year. Toilet is flushed with make-shift swinging faucet projecting from under washbasin. The airport will be improved under new management.



Trash pile blights landscape around hangar at Harlem Airport, scene of two fires costing at least $60,000. Asked what improvements and fire prevention precautions were being instituted, operator said "none." Planes still bog down in runways five days after rain.

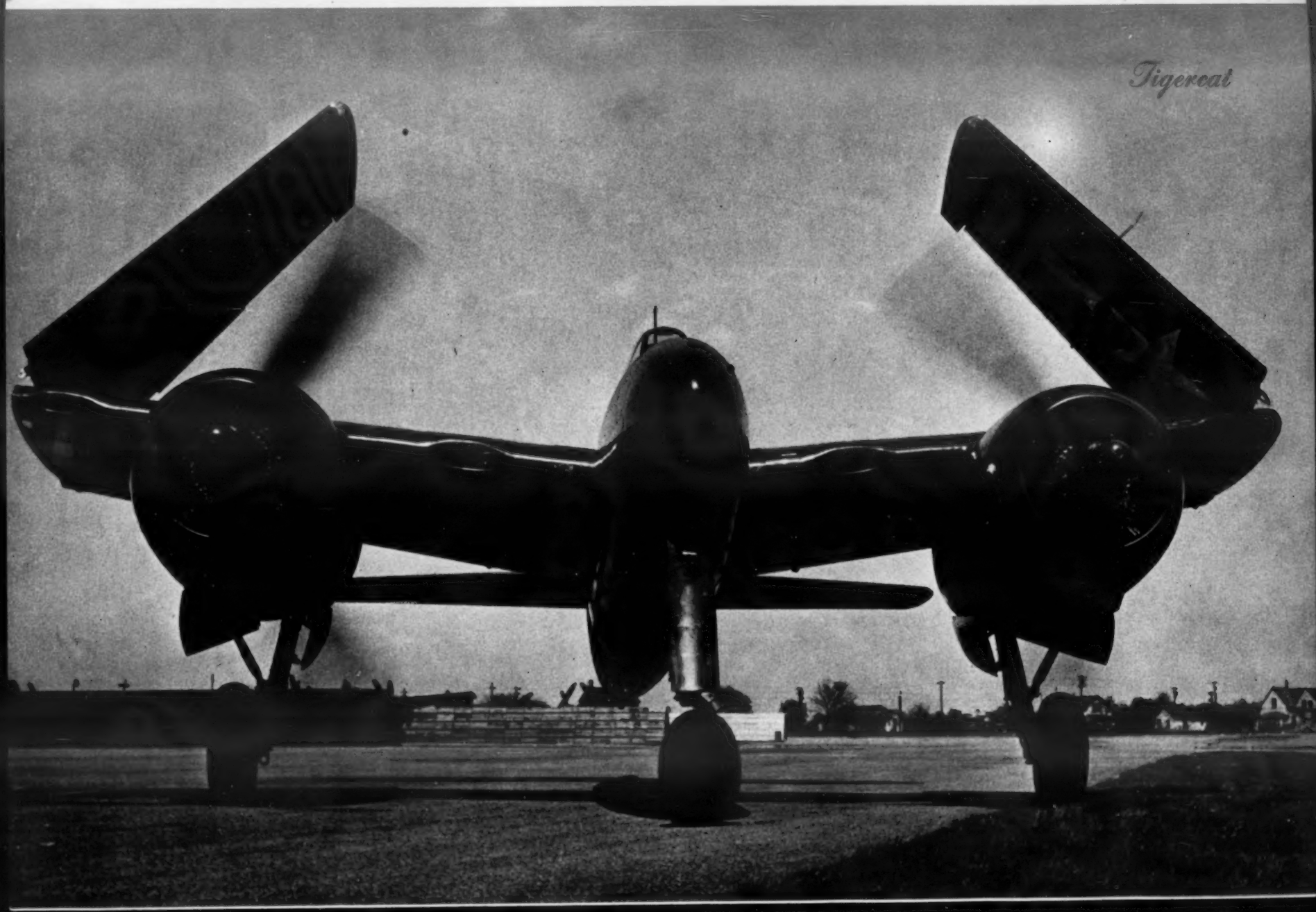
Burned to ground after above photograph was made, this hangar's exterior had been repainted since last year, but waterless toilets remained just as waterless. This wood hangar was near another which burned last year with a loss of $25,000. This year's $35,000 blaze was out of control before fire extinguishers were brought to bear.

NOW

Furnace room at Pal Waukee Airport was a fire hazard until new operator took over. Room was used for shop work, paint often being sprayed near furnace. Requirements: a clean, orderly operation.

the Month's Best
T-Craft

G-AGPV
Bristol Freighter


Tigercat

Planes buzzing houses, low flying, and other improper uses of aircraft to make loud noise are the major complaints of non-flying citizens—particularly those who live near busy private airports.

AVIATION'S SOUND AND FURY

Everybody knows we need airports—but they want them somewhere else. Biggest reason is the noise nuisance.

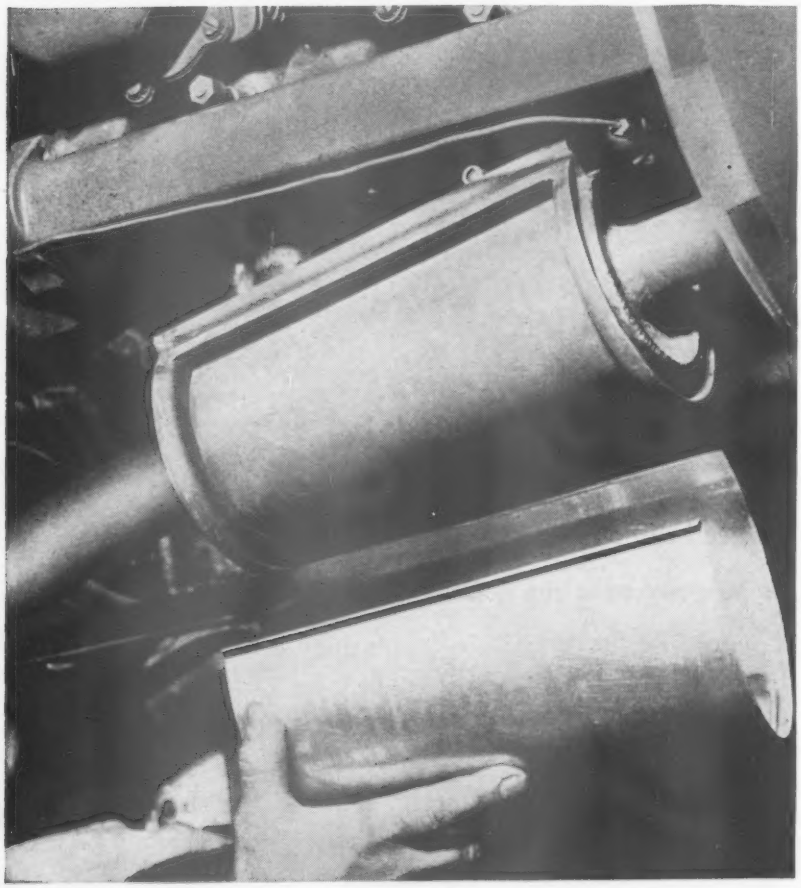
By JOHN C. ROSS

THE scene is the Los Angeles County Court House. The occasion is the Board of Supervisors' public zoning hearings. The complaint is about airports. More than 500 property owners are represented by petitions and spokesmen who object to the "property devaluation, danger and noise" which they fear will accompany the construction of airparks.

The complainants do not oppose airports as such, they hasten to explain. Not at all. They believe in progress. But they want the progress to be somewhere else. They don't want the peaceful quiet of their cosy little suburban areas disturbed by the shattering noise

Lightplane propellers, like the new Sensenich controllable model on this Culver V, have improved in everything but one respect; they are still the major source of airplane noise.

Cabin insulation is solving the noise problem in such new planes as the Stinson Voyager 150. Passengers can talk in normal tones, and a dome speaker has replaced earphones.



Muffling lightplane engines can be accomplished with negligible power loss. It doesn't help total noise much, however, because the major source of noise is the propeller.

of an airplane's exhaust, or the roar of its propeller.

"Airports are like cemeteries," says Supervisor Raymond Darby. "Everyone knows we should have them, but they don't want them nearby."

L. S. Allstrum, president of the La Canada Chamber of Commerce, is one of those who believes in progress. But he just doesn't think that a nice residential district is the place for an airpark.

"Airports like Municipal, Grand Central and so forth are essential. They are public necessities," Allstrum testifies. "The airpark under discussion is for pleasure-seeking aviators. It involves, besides landing and take-off of planes, a hotel, if you please, as they call it; a cafe, hangars, repair shops and all sorts of commercial things. This is not a necessity, just a pleasure spot."

These objections, somehow remind one of the attitude of the town fathers of 40 years ago who passed laws requiring that a man on foot must precede automobiles driving through the streets—to warn the horses, naturally. But it is an attitude that is met increasingly across the country, and one that aviation must face.

Why do residential neighborhoods object to airports? There are a number of reasons, and Mr. Allstrum's complaint lists some of them. But the most important is noise.

Quiet and airplanes have never mixed, and the complaint about noise hits the airplane where it is most vulnerable. Engineers have been trying to reduce noise for years and, for reasons to be investigated here, haven't been too successful. Meanwhile, the citizens are organizing against close-in airports.

A year ago such an organized group met in St. Petersburg, Fla., city hall to protest the din from Albert Whitted Field near the city. The defenders of the airport were all set to argue that the rumors of airplane noise were greatly exaggerated when a slap-happy pilot chose that exact moment to buzz the city hall—drowning out part of the argument.

Clair Davis, an attorney representing the property owners, declared: "If the city has the authority to operate an airport it has the right to set the conditions under which it is to operate. Property owners who have suffered from the nuisance of flyers gunning and cutting motors, mostly in training planes, and skimming over roof tops, take the position that they are entitled to some consideration."

St. Petersburg is only one of many cities with the same complaints. A controversy has been raging in Miami about the volume of traffic in the big city terminal there. However, the Florida state supreme court recently ruled that noise alone is not a sufficient ground to ban an airport as a nuisance.

Back in Los Angeles, H. R. Sault, representing the West Altadena Improvement Association, declared that "the noise of several planes circling to make a landing would be a constant source of annoyance to residents within a mile and certainly to those nearer. . . ." Other complaints included: "Homes will be con-

(*Continued on page* 106)

Ercoupe seaplane has just been approved by the CAA. Plane steers on water with rudders operated by control wheel. Floats cost $995.

Have You Seen?

World's largest tire is for one of main wheels of six-engined Consolidated XB-36. Tire weighs 1,600 lbs.

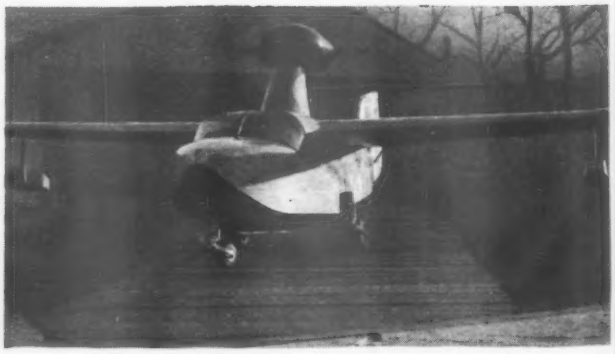
Amphibious blimps are being tested on Lake Erie by Navy and Goodyear. This L-type blimp has two main rubber floats, and a small one on rear fin.

Have You Seen?
CONTINUED

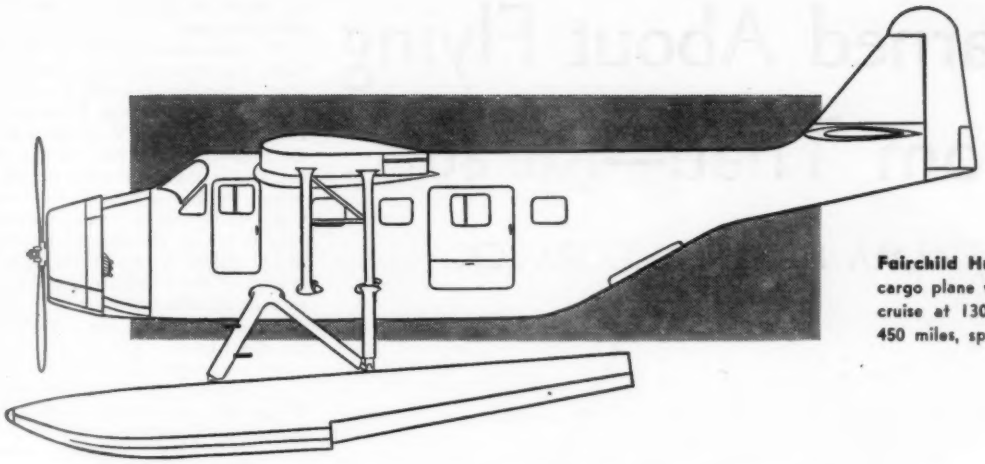
New Aeronca Chief is two-place, has 65-h.p. engine. Cruising speed is 90 m.p.h., it stalls at 38 m.p.h. Range is 420 miles. Price: $2,485.

Three-place Call A-2 has 125-h.p. Lycoming. Cruising speed is 109 m.p.h., it stalls at 45 and has maximum range of 456 miles. Span is 35 ft. 9⅝ in., gross weight, 1,550 pounds; service ceiling, 17,500 feet. Climb: 1,000 f.p.m.

Experimental British lightplane is Aerogypt, powered with two 65-h.p. American engines. It has "airfoil" fuselage, tricycle gear.

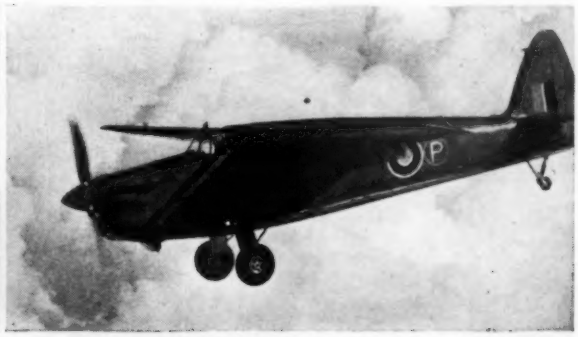


Bunyard amphibian now under test is three-place, has 150-h.p. engine, cruises at 112 m.p.h. for 500 miles. Price: about $6,000.

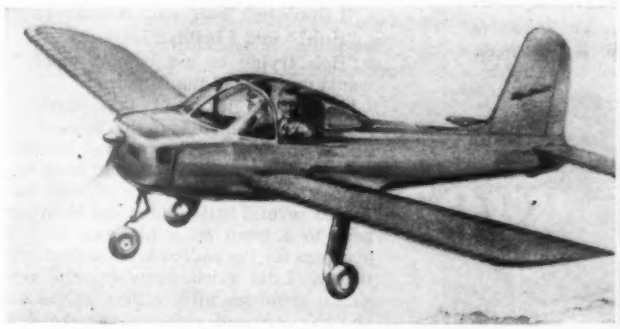


Fairchild Husky is Canadian cargo plane with 450-h.p., can cruise at 130 m.p.h. Range is 450 miles, span is 54 ft. 9 in.

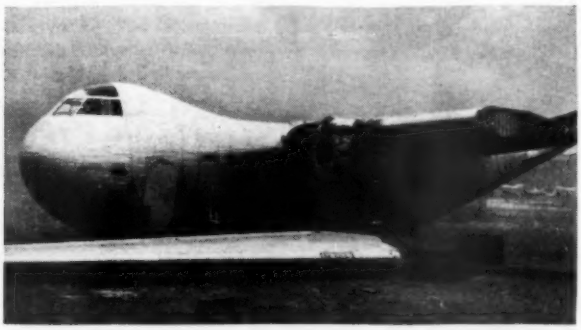
Old Waco 9, manufactured in 1928, still is licensed and flying. It has OX-5 engine and is used in California motion picture work.



Vickers Dumbo was experimental British naval aircraft with new variable-incidence wing. Note wing in slow-flight position.



Thorp Sky Scooter is new lightplane with 75-h.p. It will cruise 110 m.p.h. Gross weight: 1,050 pounds. Range: 400 miles.



Salvaged Conestoga is being made over into a gas station at Globe factory, will be set up for business in Fort Worth, Tex.

Surplus basic trainers have been bought and converted by American Airlines and will be used for instrument coordination training at Ardmore, Okla. Each cockpit has full set of instruments. The airline bought 10 of these BT-13s.

I Learned About Flying From That!—No. 80

By ALMA HEFLIN McCORMICK

Mrs. McCormick stands by a Cub similar to one described in her story.

Despite a head numbed with aspirin and flu, this pilot took off cross-country—and flew into grief.

THERE are many times when you fly commercially that it seems necessary to take off no matter how bad you feel. You take an aspirin or a cough drop, a grip on your courage and go. Who wants to be a sissy?

Well, I do.

I became a sissy after getting lost over New York, New Jersey, Delaware and Maryland, and sending my passenger to ask *what state* we were currently in. I became a sissy after landing in a deserted field and taking off from two feet of snow, after dodging power lines along Chesapeake Bay, after dodging a landing in a tank trap and after lying awake shuddering to think what might have happened to my trusting passenger.

You bet I'm a sissy. And I expect to live to a ripe old age thereby. I learned my lesson on a lightplane cavalcade several years ago.

The mess started about 5 a.m. at Allentown, Pa., where I had stopped overnight after a too-late take-off from the Piper factory at Lock Haven. I wanted to make Roosevelt Field, N. Y., in time to pick up the passenger who had been assigned to me, and in time to leave with the eastern wing. The motor refused to start. There was nothing visibly wrong but we worked over it for 50 minutes in a temperature of 14 below. When I finally got off and landed at Roosevelt, I should have gone to a hotel, climbed into bed with a few dozen assorted cold remedies, and joined the flight later.

My passenger, Kenneth Fletcher, who was covering the trip for the United Press, had never seen me before and probably thought the numb look was natural. Anyhow, he said nothing. We climbed into the plane and trundled off with the last squadron.

The leader of the squadron was flying a white Taylorcraft. I had not the vaguest idea who he was, but there was a vacancy at his left wing-tip so I fell into place in the "V" and folded up my map. In spite of the hot coffee, I felt lousy. My head was throbbing, my cheeks burning, my hands and feet were as heavy as lead. If the pilot in the white plane was going to be navigating, why should I duplicate it? Thank heaven for planes that could practically fly themselves. I slumped in the seat and half-closed my eyes.

It was strange how the *Cub* seemed to be so fast. We were constantly creeping up even with the leader's wing, then nosing ahead. I throttled back. We crept up again. I throttled back some more.

"I think he's lost," said Kenneth.

"Huh?" said I brilliantly.

"He's trying to get behind you. He wants you to lead the squadron."

"Holy heaven," said I devoutly. I looked at the map and the ground, but nothing matched! The railroad below us was a single-track. We should have been over a double-track! We should have passed several little towns and been very near to a town on a highway with an overpass for the railroad. I searched frantically. I did quick, fuzzy, hopeful navigation problems after a look at the map and the airspeed and some smoke drifting from a chimney. It drifted off nearly level. The wind was about 20 m.p.h. I peeled out of the formation and lined the plane up over the smoke to get the compass direction of the wind. The leader turned docilely and followed me over the chimney. The three other planes followed us over the chimney. I straightened out on the previous course. The other planes trailed back onto the course behind me.

"I think," I said at last, "that we're off-course to the east about 10 or 15 miles. Or would that put us over the Atlantic? Anyhow, I'll fly a course to correct that much error and in about 20 minutes we should pick up a landmark along this line that marks the course we should be on."

"But if we're not that far off?" asked Kenneth.

"Then we'll cross our course line that

(*Continued on page* 96)

Tire Tip from Alaska

"In our year-round operations throughout Alaska, we have found that Goodyear tires give exceptional performance on our Douglas DC-3's under all weather conditions." A. G. WOODLEY
***President*, Pacific Northern Airlines**

Here is further confirmation of what veteran fliers and airplane servicemen know from long experience. Goodyear airplane tires give more dependable service because they are built with an extra margin of ruggedness that provides super-safety when the going gets rough — insures longer wear under all conditions. Best proof of that is the fact so many well-known pilots and airplane manufacturers specify Goodyears — the world's first choice in airplane tires, tubes, wheels and brakes. For information, write: Goodyear, Aviation Products Division, Akron 16, Ohio, or Los Angeles 54, California.

Best for Long Wear — Like Pacific Northern Airlines, you'll like this Goodyear Rib Tread tire because of its long wear in service involving many landings.

THE LIBRARY

THE AIRCRAFT ANNUAL—1946, by David C. Cooke; published by Robert M. McBride & Co., 116 E. 16th St., New York, in 1946. 304 pages. Price $3.

This book obviously is intended to be competition for the Aircraft Year Book, an annual published for many years and edited by Howard Mingos. Both are primarily reference books and both suffer from similar handicaps: they are out of date in some sections even before they reach the bookstores, both are poorly indexed, the Cooke book being the poorer of the two in this respect; it has no index.

The Aircraft Annual should be a worthwhile addition to the air enthusiast's library, despite the fact that the reader will have some difficulty locating specific bits of information he may want. Aside from that fact, the reader will find the book interesting reading, popularly slanted, well illustrated and well laid out.

From the standpoint of accuracy, Cooke leaves something to be desired. He lists Porterfield as a current manufacturer of lightplanes; Porterfield disappeared from the scene several years ago. He catalogues two Stinson aircraft in production, the "125" and "140." Actually, the "125" was prepared for production, then the engine and design of that airplane were changed to the present "150." The "125" never was produced and a "140" was unknown until the appearance of Cooke's book. He also lists Rearwin as being currently active; this company, too, has been out of business for some time.

Cooke should have been more careful with some other facts, too. While it is an understandable failing to quote directly from the mass of publicity material gathered for this book without questioning its facts, the author of such a book must assume responsibility for what it contains. Cooke says in several places, for example, that the Lockheed *Shooting Star* "is the fastest fighter in the world" and "faster than the British Gloster *Meteor*." Apparently Cooke is unaware of the fact that the *Meteor* set the official world speed record of 606 m.p.h. some time ago. That record still stands as this is written.

—MAX KARANT

FUNDAMENTALS OF AVIATION, by Norman Potter and William J. Konicek; published by Link Aviation Devices, Inc., Binghampton, New York, in 1946. 107 pages. Price $1.

Here is a book of the same title as that reviewed by Mr. Hoyt (FLYING, June '46), one that gives an even more simplified coverage of aviation fundamentals. Its 8½x11-inch pages contain 114 illustrations interspersed among 10 chapters of textual material that are definitely modern in their educational approach. Questions covering the study material are supplied together with a glossary of aviation terms and suggestions as to use of simple classroom training devices. Slanted particularly to youth, the content also should prove valuable to the student pilot who is no longer required to study CAA manuals in preparation for the private pilots examination.

A limited edition and available only on special order, the book was prepared as a prospectus on one of the several courses Link Aviation Devices, Inc., will present in promoting aviation education in high schools and colleges. Preparation of material has been based upon studies of "curricula, teacher training, technical books, classroom training aids, and other pertinent aviation education matter."

After revision (to be suggested by aviation and educational leaders to whom the present issue has been routed), this and other such texts will be offered as a working text for high school and college aviation classes and for Air Scouts, Civil Air Patrol units and other air education groups. Reduced prices on bulk orders will be quoted upon written request to the Link company.

—PAUL FOUNTAIN

FLYING

"In subsequent models, of course, we do hope to eliminate a little of that torque!"

SHORT VIEWS

AIR WORDS, by Fred Hamann. Published by Superior Publishing Co., Seattle, Wash., in 1946. 61 pages. Price $1.50.

The author, who collects words as some collect stamps, presents 52 pages of airport-born words, many of which would never be salvaged in a standard dictionary for tomorrow's historians. Suggested for the novice in aviation who has a hard time understanding the "poop artist" talk about airplanes.

AIRPORT BUILDINGS, published by U. S. Department of Commerce, Civil Aeronautics Administration, U. S. Government Printing Office, Washington 25, D. C. Price 10c.

The Civil Aeronautics Administration has gathered the material for this pamphlet from information obtained from airport managers, city officials, airlines personnel, architects, engineers, and others. The booklet discusses the problems of airport building design.

Cessna *selects* GE

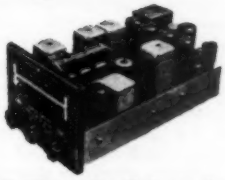
The Cessna 140 "The Pilots' Airplane."

Designed with every feature of safety and comfort—from full-range flaps to sound-proofed cabin, the new Cessna 140 has won wide acceptance as "the pilots' airplane". In this fine ship, the G-E Flying Radiofone is optional equipment. For in this radio is a dependable flight-proved 2-way communications equipment that increases your communication range, gives you clearer and stronger reception, provides a higher selectivity that cuts adjacent station interference to a minimum, brings you superlative broadcast entertainment.

The Flying Radiofone includes a super-sensitive receiver and a transmitter that delivers 12 watts of power. It is simple to operate and economical to own. For easy installation the Radiofone is designed in two units—the transmitter-receiver, and the power supply. Both have the new G-E plug-in feature for quick and easy removal.

Ask to see this outstanding personal plane radio at your nearest field. Write today for complete information: *Electronics Department, General Electric Company, Syracuse 1, N. Y.*

Flying Radiofone



The G-E Flying Radiofone, the standard radio on the Cessna 140.

- Longer Range
- Clearer Reception
- Low Battery Drain
- Simple to Operate
- Dependable 2-Way Communication with Fixed Antenna
- Range Voice Filter
- Long Tube Life
- Loop Operation
- 12 Watts Power Output
- 12 tubes
- 12 lbs. (Receiver-Transmitter and Power Supply)
- Compact and Sturdy
- Plug-in Design for Easy Removal
- Reasonably Priced

Like Cessna, many leading personal plane manufacturers are specifying the G-E Flying Radiofone for their airplanes.

12 WATTS | 12 TUBES | 12 LBS.

THE G-E MONOGRAM FLIES IN ALL U. S. ARMY AND NAVY AIRCRAFT

GENERAL ELECTRIC

AOPA NEWS

The Aircraft Owners and Pilots Association (AOPA), with National Headquarters Office located in the International Bldg., 1319 F Street, Washington 4, D. C., is a nonprofit organization composed exclusively of pilots. It looks after the pilot's best interests in all phases of aviation and helps individual pilots with their individual problems. The AOPA operates with a full-time professional staff and is the largest group of civilian pilots in the world. This column is edited by the Aircraft Owners and Pilots Association and opinions contained in it are not necessarily those of FLYING. A special bulletin is sent each month to all registered AOPA pilots and also confidential newsletters from AOPA's Washington staff are sent members from time to time.

AOPA ADDS MONEY-SAVING SERVICE

AOPA pilots next week will really be money ahead as a result of a brand-new service announced recently to its members. The Association has completed arrangements to obtain for its members and itself various forms of aviation insurance at greatly reduced rates.

AOPA pilots are now able to request exclusive participation in this program and may save from 20 to 40 per cent on their aviation insurance costs.

Members may obtain *personal accident insurance* either on a "flying only" basis or, if they prefer, full "24 hour" coverage with benefits payable in the event of occupational, home and automobile accidents, etc., in addition to the regular flying accident protection. Medical expenses for doctors and nurses as well as weekly "indemnity" payments are also available.

AOPA pilots may also obtain *aircraft coverages* including flight and ground accidents, public liability, property damage and other types of protection.

In announcing this new arrangement J. B. Hartranft, Jr., AOPA's general manager, stated, "This constitutes one of the greatest steps yet taken by AOPA to assist its pilot members. It is difficult to see how any qualified pilot can now afford not to register as an AOPA pilot. It should be emphasized," Hartranft continued, "that this new insurance has been made available to AOPA and its members *exclusively* and that only pilots holding currently effective AOPA pilots' credentials will be considered eligible for participation."

Commenting upon AOPA's future plans Hartranft said, "This is the first of a series of new undertakings designed to give AOPA pilots more money-saving assistance in the pursuit of their flying activities and to make flying 'more useful, less expensive, safer and more fun'."

GCA GAINS FAVOR

For many months, AOPA has pounded away at the proposition of adopting GCA (Ground Control Approach) in place of so-called SCS-51 system advocated by the CAA. It looks as though AOPA is steadily gaining ground as more and more pilots learn of the superior performance of the GCA equipment. Private pilots in particular are quick to applaud the great simplicity of this system which requires no additional equipment in the airplane as does the SCS-51 system. Even airline pilots, once they have tried both systems, are beginning to become enthused.

It is reported that the Navy has now declared itself for GCA in preference to the complex CAA-sponsored system. This is good news and we have also observed many new Army "leanings" toward GCA in the past few weeks as a result of the tests which are currently being run by the CAA at its Indianapolis proving ground.

AOPA pilots may arrange through AOPA's National Headquarters to fly the GCA system at Indianapolis. Aircraft used in such tests should be equipped with two-way radio (it makes no difference which kind so long as it operates) and primary flying instruments (gyro horizon, compass, rate of climb and bank and turn). It is even possible that blind landings may be made for at least low approaches with even less cockpit instrumentation than the standard primary group.

Another development in the GCA picture is the new "one-man"-operated GCA ground set which does away with the five-man crews previously required to bring pilots down. This new development, which is now built and in successful operation, should also remove some of the CAA objections about manpower requirements. All in all, it looks good for GCA and that means that the private pilot at long last is in for a good break in his future plans for instrument flight.

AIRPORT APPROPRIATIONS LACKING

AOPA pilots by the carload have written in asking how to get funds for airport construction since the National Airport Act was approved by the Senate on April 30 by a vote of 49 to 32. As we go to press, Congress has not yet passed the appropriation bill which comprises the next step in implementing the program.

As passed by the Senate, "any public agency" may submit a "project application." This means that a county, township or municipality as well as states may seek Federal-aid funds for airport construction or improvement. It is not necessary for Federal-aid funds for airports to be channelled solely through the states unless the individual state concerned has enacted legislation prohibiting municipalities or other public agencies in that state from making airport development project applications to the Federal Government. Wyoming is the only state to our knowledge so far which has taken such a move.

CAUTION USED INSTRUMENT PURCHASERS

Some of the "inexpensive" brands of instruments recently appearing on the market are causing trouble for their owners, according to reports of AOPA pilots to national headquarters. "Rebuilt" surplus instruments are also receiving their share of unfavorable comment.

AOPA has issued a warning for its pilots to buy their instruments with care. This is very important if pilots contemplate use of a flight plan. Since Part 17 of the Civil Airworthiness Specifications requires that if personal aircraft are to be used for instrument flight according to the new regulations, they will have to use instruments meeting certain standards. *The instruments now being provided as standard equipment in many light airplanes do not meet these requirements.*

There are too many instances reported to AOPA of airspeed indicators which stick, jump or otherwise "act up." In one instance, the airspeed indicator on a brand-new lightplane was tested and it was found that it stuck at 78 m.p.h., giving no higher indication even if the airplane was dived.

On landing, the pointer came back slightly to 60 m.p.h. whereupon it immediately jumped back to 40 m.p.h., giving the pilot the impression that he is somehow rapidly moving into a stall.

Recently there have been advertised a number of rebuilt instruments which are giving poor results. Typical of this group is the "rebuilt" Army airspeed indicators (made by Pioneer originally). Quantities of these have been purchased and converted from high range to low range for personal plane use and then offered for resale. A sample converted indicator was recently acquired and tested and it was found that the errors in the landing and stalling range were as high as 10 m.p.h. This, coupled with the pitot tube installation error, would make the indicator extremely dangerous to use on any airplane. Yet thousands of these instruments are being offered for sale.

RESULTS OF NASC QUESTIONNAIRE

Of interest to all pilots and aircraft owners is the following summary of the results of the recently completed National Aircraft Standards Committee questionnaire answered by lightplane manufacturers on the subject of radio requirements.

Here are the high-lights: 12 volts was selected as the standard electrical system for personal aircraft. On maximum size of radio sets for instrument panel mounting opinions varied as follows: width, 4¼ in. to 8 in.; depth, 5 in. to 14¼ in.; height, 4½ in. to 8 in.

No decision was reached as to whether it was desirable to have receivers and transmitters designed as separate units or complete units (AOPA favors one unit). It was the consensus that a separate radio power supply was not required for weight and balance reasons

(*Continued on page* 100)

Builds Quality Planes– Boosts Quality Protection!

NEW IMPROVED MODEL D18S typifies Beechcraft's high standards of manufacture . . . offers even better flight performance than its famed wartime predecessors.

Beech Aircraft

Endorses Socony-Vacuum Aviation Products

This leading builder of six and eight-seated personal transports rates *correct lubrication* on a par with finest design, workmanship, materials. And with good reason...

For Correct Lubrication—the kind you get with Socony-Vacuum Aviation Products—means maximum protection for precision plane parts, maximum hours of trouble-free flying!

Get this same protection for *your* plane—with special Socony-Vacuum greases, instrument and hydraulic oils. And for top operating efficiency, try famous Mobiloil Aero . . . Mobilgas Aircraft for Flying Horsepower!

SOCONY-VACUUM OIL COMPANY, INC.
and Affiliates: Magnolia Petroleum Co., General Petroleum Corporation

AVIATION PRODUCTS
SOCONY-VACUUM

Mobilgas Aircraft
Mobiloil Aero

The Lightplane Goes Farming

(*Continued from page* 18)

he uses his own plane or has a commercial service do the job for him, the farmer is discovering that aircraft can be an economic asset for dusting, planting and for many other practical purposes on the farm itself."

In short, the farmer is looking at the airplane with more than passing interest for one very practical reason—it's good for his business.

Take, for instance, a farmer-aviation program now underway in Nebraska, Iowa, Minnesota, Colorado, and North and South Dakota. It's going strong because it pays dividends—for the farmer. Organized by the Archer Petroleum Corporation, with approximately 3,500 dealers in these six states, many of whom are already farmers, the program is designed so that farmer-dealers can get into the air-strip business with a minimum of investment and effort. It also benefits the nearest aviation fixed-base operator by giving him more student pilots and brings additional business to Archer, which has made a specialty of aircraft oils for many years.

The formula is simple. Archer sells its farmer-dealers on putting in a flight strip, then goes to the nearest airport and sells the operator on teaching students to fly from the strip on a specified day each week. The operator agrees to pay the farmer-operator from 50 to 75 cents an hour for student flights off the strip, as well as commissions on all aircraft sold. The commission on such sales is customarily five per cent.

To start flights, the farmer-dealer is given a supply of cards offering an introductory 15-minute flight instruction ride for $1.75, with a free log book thrown in. The farmer doesn't have to sell anything but the $1.75 ride—it's his job only to get his neighbors out and give the operator an opportunity to sell them on a complete course.

And it works. "It has been our experience," says F. F. Nebergall, Archer sales manager, "that more than 50 per cent of the people who take the 15-minute flight instruction ride develop into students." He adds:

"We now have 40 strips in operation and they are all clicking 100 per cent. Although the first step is, of course, getting students, a good number of airplanes have been sold from these strips—and that part of the set-up is just getting started.

"What it boils down to," he summarizes, "is a deal whereby the fixed-base operator has three or four auxiliary fields where he can take flight instruction out to the farmers throughout his territory instead of waiting for them to come to him. And it also puts several commission salesmen to work for him so that his instructor has a full day of work lined up for him when he gets there—plus a man to plug aircraft sales in that neighborhood seven days a week.

"Our plans call for establishing from 500 to 1,000 strips within the next 18 months."

Other sources support the findings of at least one pre-peace prophet, Dr. F. L. Whan of the University of Wichita. He reported after a Kansas survey that farmer interest in flying would be more than double city interest in the post-war world. His survey of 10,000 farm families in Kansas showed that 455 planned to buy a plane, while of 10,000 city families, only 196 planned to buy. Indeed, these figures may turn out to be conservative so far as rural buyers are concerned. Potential farmer flyers are increasing in numbers daily.

Noteworthy for interest in aviation is the National Flying Farmers Association, an outgrowth of the Flying Farmers of Oklahoma, who first met at Oklahoma A. & M., Stillwater, Okla., in 1944. That year 12 planes showed up. Last year, despite the war, 130 farmer-owned aircraft appeared. Since then, following the launching of the national organization, other meetings have cropped up all over the middlewest, each larger than the last. Flying Farmers convened in Chicago in mid-spring, organized a four-state group —Indiana, Illinois, Wisconsin and Michigan—and scheduled a meeting for Purdue University Airport July 29 at which service facilities for 300 airplanes have been requested. The four-state group already reports a membership of 600, matched by membership in the Iowa unit which met at Iowa State College, Ames, a few weeks ago. More than 100 planes showed up for this meeting.

Nebraska's Flying Farmers will gather at Omaha July 19-20 as part of the NAA's national convention on those dates, and Stillwater, hub of the activities in the southwest, will climax the 1946 meetings with a national convention of air-minded agriculturists August 1-2. H. A. Graham, national secretary of the organization, predicts that flyers representing at least 15 states will attend.

For while the middlewest and southwest seem to be leading the farm parade into the air, farmer organizations are also reported underway from such widespread areas as Arizona, California, Florida, Pennsylvania, Montana, New York, and Maryland.

West coast reports are especially encouraging.

"The airplane is here to stay in California agriculture and its use is bound to grow," says a Farm Bureau Federation spokesman in that state.

Reporting that 240 farmers own or have ordered planes in the state of Washington, Wiley R. Wright, CAA's personal flying development expert in the northwest, recently completed a survey tour of Washington, Oregon, Idaho and Montana and on returning declared that "it's the country people and those in the smaller towns that are showing most enthusiasm for flying of all types right now—

FLYING

"Y' gotta admit this kinda takes the glamor out of it . . ."

500...COMING UP!

★ **THE BELL MODEL 47B HELICOPTER**—*powered by a six cylinder Franklin Aircooled Engine of 175 H.P.—has a gross weight of 2100 pounds, including a useful load of over 600 pounds. It utilizes a patented two-bladed rotor and gyroscopic stabilizer. The Model 47B is noted for smoothness of flight and ease of control.* ★

FIRST Helicopter in history to be awarded a commercial license, Bell Aircraft's two-place Model 47B is now being put into quantity production. Initial deliveries from the first 500... to government agencies, industry and agriculture... scheduled for early Fall.

This remarkable rotary wing craft offers a new kind of *all-weather* utility. The Bell Helicopter needs no airports, no costly pavements or other landing facilities. It can reach hitherto inaccessible places. And it can land safely in "auto-rotation".

For full facts about the Model 47B Helicopter—performance, operation, utility ... simply write: Helicopter Division of Bell Aircraft Corporation, Box One, Buffalo 5, New York.

BELL HELICOPTER FIRST IN HISTORY TO RECEIVE COMMERCIAL LICENSE

On March 8, 1946, Bell Aircraft received a CAA Airworthiness Certificate on its two-place Model 47 helicopter, and CAA license number NC 1H, *the first helicopter "NC" license ever issued.* These certificates were issued after exhaustive flight tests in which the Model 47 ... prototype of the Model 47B ... met every airworthiness requirement of the CAA.

*Reg. applied for U.S. and principal foreign countries.

BELL Aircraft CORPORATION

P. O. Box 1, Buffalo 5, New York

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PACEMAKER OF AVIATION PROGRESS

and farmers use their planes for just about everything."

Twice-told is the tale of how farmers put a plane to work, but a coast-to-coast FLYING survey indicates that in many instances something new has been added. Certainly, lightplanes are being employed to do everything from taking the kids to school and wives to a bridge game, to saving thousands of dollars by flying broken parts for farm machinery during a harvesting crisis and rushing veterinarians into a stricken area to save whole herds from disease.

Planting as well as pest-control has grown wings. From entomologists of the California Department of Agriculture comes word that 80 per cent of the state's 250,000 acres of rice were seeded from the air even before the war, in addition to 150,000 acres being crop-dusted. Substantial increases are anticipated in 1946.

Aerial sowing has resulted in development of the pelletized seed packed in a gelatinous case carrying fertilizer. A new development in the Northwest is a spray for apple and pear trees to make bigger and better fruit and prevent the fruit from dropping and rotting until harvest time.

As is true on midwest and southwest ranches, the airplane has proved economic in sowing range grass on remote fields, doing in an hour a job that would take a ground crew weeks to accomplish. And from Florida, second largest cattle-producing state in the nation, CAA's regional lightplane administrator, C. W. Clifford, reports widespread ranch use of planes.

While most spraying and sowing tasks are not done by the average flying farmer —who prefers to hire the hedge-hopping work out to a professional—reports from the field indicate that, with a plane in the barn and a professional flyer son returned from the war, not a few farmers are doing seeding and spraying with their own equipment.

Some veterans are flying farmers in their own right. Wilbur White, of Poplar, Mont., a former AAF pilot, plants his wheat from an ultra-modern seed box installed in his lightplane in half the time it used to take. He also wages insect war from the air and flies a veterinarian with him if his cattle are ailing. He estimates that his yearly savings almost pay for the cost and upkeep of the plane. And I. K. Bollenback of Kingfisher County, Okla., a former AAF flight instructor, seeds from the air with a Piper *Cub*, flying 30 or 40 feet from the ground.

The plane is also useful for harvesting. Typical is the flight work done by Mr. and Mrs. Ki McDaniel of Danville, Kan., who inspect and service harvest crews from the air.

Other uses for the farm plane are surveying from the air, either with or without a camera, determining crop conditions, finding lost cattle and counting large herds, estimating the number of producing trees in a large orchard, spotting blights, checking soil erosion and windmills pulling water for cattle, and inspecting irrigation facilities.

Nor has the farmer's wife—not to mention the kids—ignored the flying machine. Families of pilots are beginning to turn up down on the farm, as is true at Arvid Temple's place in Buffalo, Okla. Temple has been flying since 1927 and his wife and two daughters have student permits and fly solo.

"We could sooner do without a car than a plane in running our 1,400 acres of wheat and livestock land," he says. "It's especially valuable in harvest time, when my brother and I can inspect my acreage and his 4,500-acre tract in 30 minutes instead of almost as many hours." Mrs. Temple is doing more and more of the flying, he reports.

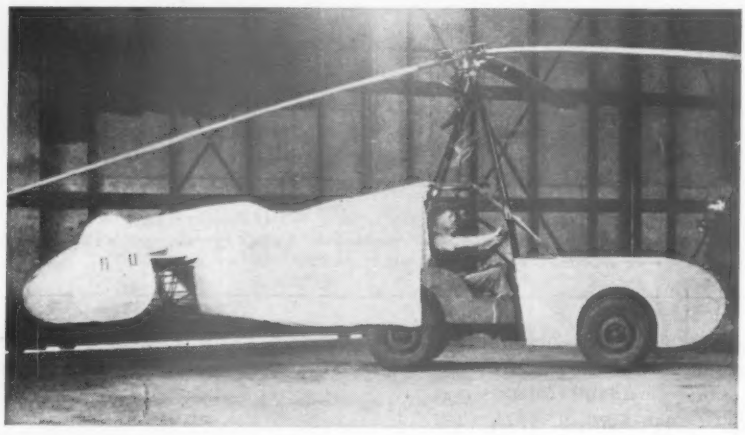
Flying Farmerette Dorothy Arnold of Washabaugh County, S. Dak., recently flew to Rapid City to pick up 500 baby chicks, bringing them home, 100 miles distant, in about an hour. Delivery would have taken at least 12 hours on the ground. Miss Arnold also delivers rush orders of dressed poultry and eggs by plane and pilots her father whenever he takes a business trip.

Indispensable to his operation of four combines, used to harvest wheat for himself and other farmers in the southwest, is the airplane of Gene McGill of Woods County, Okla., who spends off-seasons spotting big wheat farms and landing near the owner's house to sell him his combine service. And there is even news of a beekeeper in Reno County, Kan., named John Howell, who picks the spots to pasture his honey-makers from the air —at a great saving in time and money. Similar air service for bees is reported from Florida.

Close observers in the field go on to point out that the farmer has the economic advantage over his city cousin when it comes to flying. In metropolitan areas the hangar problem, for one, grows increasingly acute. But down on the farm there is usually room for one more machine in the barn—or you can build an extension.

Building an airport is a long and involved operation in most communities of any size. In the country a farmer who has the land to spare can often put in an adequate landing strip simply by planting a cover crop. He can use land that lies fallow one year and rotate his airfield as he does his crops. It's an easy problem for flat-land farmers.

Add it all up and it would seem that the citizens of Oklahoma, where the Flying Farmer movement first took off, are correct in calling it the "Sooner" state—at least when it comes to agricultural aviation. But everyone else seems to be coming in plenty fast. END

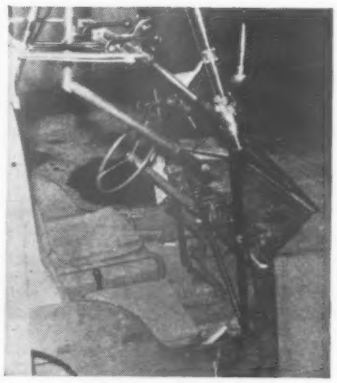


THE FLYING JEEP

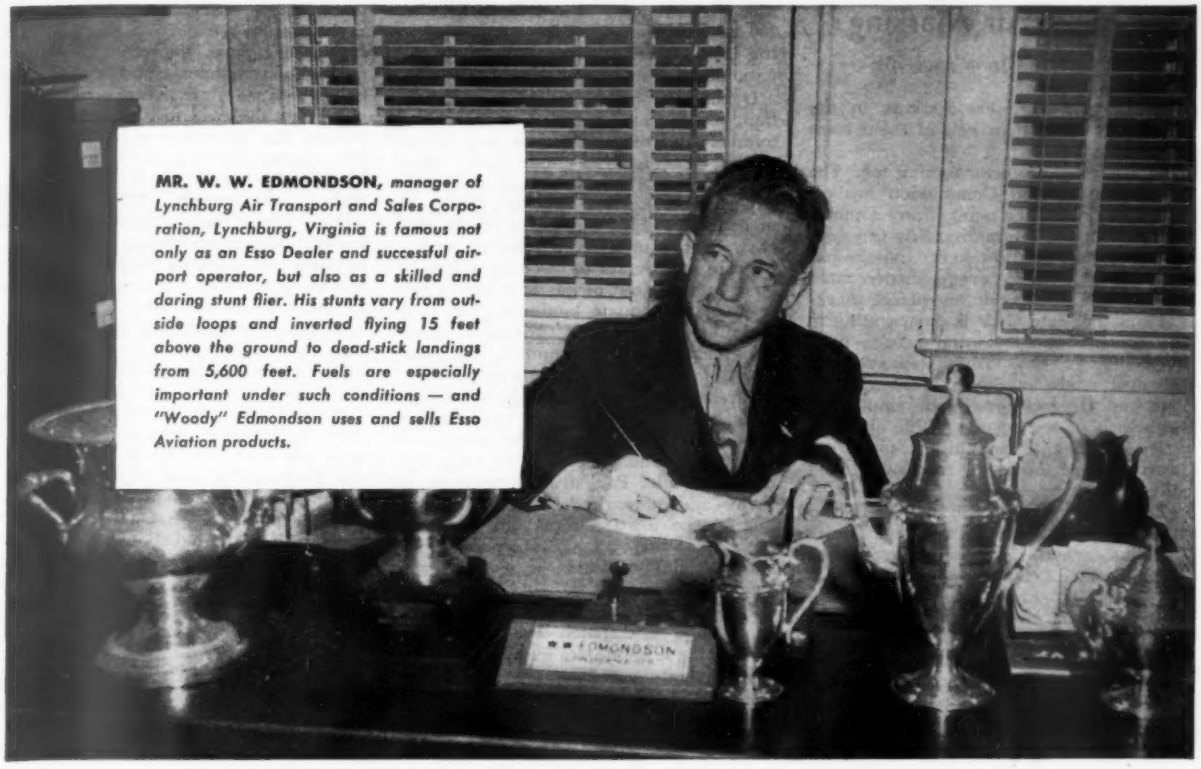
PEOPLE have said a jeep can do "anything but fly," but Australian inventors tackled even that problem during the war and might have succeeded in putting them in the air if their experiments had continued.

There was a desperate need for aerial transportation of jeeps during early stages of the New Guinea battles and conventional air transportation had proved impractical.

The inventors attached a tail surface to a jeep and an autogiro-like windmill over the front seats. The idea was scientifically sound but the project was discontinued when the New Guinea battle picture changed. Aussies called the device a *Fleep*.



No. 6 IN A SERIES, *featuring some of the 700 Esso Aviation Dealers throughout 25 states*



MR. W. W. EDMONDSON, *manager of Lynchburg Air Transport and Sales Corporation, Lynchburg, Virginia is famous not only as an Esso Dealer and successful airport operator, but also as a skilled and daring stunt flier. His stunts vary from outside loops and inverted flying 15 feet above the ground to dead-stick landings from 5,600 feet. Fuels are especially important under such conditions — and "Woody" Edmondson uses and sells Esso Aviation products.*

"Esso Products have increased our Transient Trade!"

SAYS OPERATOR EDMONDSON

"In over 6 years we have never had a single complaint about Esso aviation gasoline or oil. And in this time our gallonage has climbed continually. Furthermore, we have found that by using Esso products our transient trade has increased considerably indicating that we have a good selling point right in the name Esso."

NO WONDER Esso has helped increase the business of many an airport operator—every big gun in the arsenal of hard-hitting sales promotion and advertising stands ready to back up our 700 dealers! And every one of our products is backed up by over 40 years of aviation experience, over 2000 research scientists and the industry's largest aviation test cell.

MR. AIRCRAFT OWNER: Why not tear off this list and put it in your map case for ready reference on future trips throughout Virginia?

Alberta Air Associates, Inc., Alberta; J. L. Boland, Ashland; A. A. Rucker Airport, Bedford; Garner Aviation Service, Chester; J. D. Lincoln, Chilhowie; Southern Airways of Danville, Danville; Brickert Oil Company, Farmville; Garner Aviation Service, Fredericksburg; Coiner Flying Service, Front Royal; Galax Airport, Inc., Galax; Gordonsville Municipal Airport, Gordonsville; Shenandoah Airways, Harrisonburg; Hummel Aviation Service, Hopewell; Garner Aviation Service, Hot Springs; Lawrenceville Flying Service, Lawrenceville; Leesburg Air Service, Leesburg; E. N. Bare Flying Service, Lexington; Lynchburg Air Transport & Sales, Lynchburg; Ashburn Flying Service, Manassas; Montross Flying Service, Montross; Buford Aviation Service, Inc., Route 460, Montvale; Narrows Airport, Narrows; Glen Rock Flying School, P. O. Box 2362, Norfolk; Norton Aviation Service, Norton; Petersburg Municipal Airport, Petersburg; Peninsula Airways, Phoebus; Pulaski Municipal Airport, Pulaski; Clinch Valley Airways, Richlands; Central Airport, Richmond School of Aviation, Richmond; Roanoke Municipal Airport, Roanoke; John Eure Aviation Service, Suffolk; Virginia Air Service, Warrenton; Waverly Municipal Airport, Waverly; Richmond School of Aviation, West Point; Aviation Service, Inc., Scott Field, Williamsburg; Garner Aviation Service, Windsor.

Who's to Pay for U. S. Air Marking?

(*Continued from page 25*)

were only 20-odd new markers in the state—and more than half of them were inaccurate.

Other states are campaigning too. The Nebraska Aviation Commission has offered to pay for the paint if any community will install the marker. As this goes to press, there are no takers. Indiana has sent a bulletin to every incorporated town of 500 or more to encourage markers and the state CAP is co-operating in the drive No substantial results have been shown. New York, Pennsylvania, Missouri, Alabama, South Carolina, Michigan and Oregon have made similar efforts with similar results. Ohio even has a law making it compulsory for every town to have an aerial road-sign. And still no markers.

Three states have had a little better luck. Most successful has been North Carolina, where Frank Dawson, Wing Commander of the state CAP, has led an intensive campaign for markers. A community or civic group puts up $75, and a crew comes in and puts up a marker. To date, 111 signs have been installed. Connecticut's program, under the state commission, has resulted in 37 markers. South Carolina has made 25.

But the fact remains, after two years of intensive campaigning on a nation-wide project that is 10 years old this spring, that a grand total of a little more than 200 new markers have been installed in the United States. Experts estimate the national need at a minimum of 50,000.

If potential accidents are any indication, you can also write off an increasing number of lives and planes as a result of the lack of aerial guide-posts. Most of the private flyers today—all of the inexperienced ones—fly contact. There are no estimates of the number of deaths that have been caused by a pilot buzzing a town in an attempt to discover where he is, or running out of gas in a vain effort to find an adequate landmark, but they undoubtedly run into substantial numbers and are due to mount as the post-war flying boom gets underway.

Already stories of the tragedies owing to lack of air markers are beginning to appear. A Silver Springs, Md., couple, off on a flying holiday, spun in the other day at Coatesville, Pa., strange territory to them—and unmarked. The plane had buzzed the town several times looking for a place to land. "State police," the story concluded, "said the weather was clear and there was no wind."

Planes are even landing in the streets, as witness a dispatch from Cleveland concerning a Minnesota man and his wife who recently sat down on a street in Shaker Heights and, says the story, "took off again after receiving directions."

I might add, as both an early-era automobile driver and an amateur pilot, that I know exactly how they felt. As a youngster, I drove a car from Arizona to the eastern seaboard, stopping at every crossroads to ask the way. There were no highway signposts and it was tough going because your average native usually knew the road to the next town but seldom the directions to a distant city. The present highway marking system, as sponsored by the U. S. Bureau of Roads, makes cross-country travel by automobile simple and pleasant. Once the Federal Government has established a uniform air marking system, travel by private plane will likewise become more simple, safe and inviting.

To put it affirmatively, scores of flyers who have experienced the luxury of using markers can testify to how it saved their lives. From well-marked North Carolina, for example, comes a story date-lined Fayetteville; beginning, "There's at least one pilot who should be grateful to the Fayetteville unit of the Civil Air Patrol todav. . Investigation revealed that the pilot, who had only 17 minutes gasoline left, spotted the air marker that the CAP, with the aid of the Fayetteville Chamber of Commerce, had painted on the freight station some months ago." The plane landed at the local airport without mishap.

Why, in the light of these facts and this testimony, to which any pilot who reads this can add further data from his own log book—why a national marker program is not already under way is one of the minor mysteries now confronting us Everybody favors markers. As Miss Noyes puts it, "Perhaps it would be easier to get something done if somebody could be found who doesn't favor them!" They are easy to put on the roofs of hangars, high schools or prominent buildings.

There is even trained leadership to carry the program forward. Blanche Noyes, CAA's air marker specialist, has been flying since 1929, won scores of national races, including the Bendix in 1936. and since that year has been the country's leading air marker expert.

And still there has been no concerted effective action.

This spring, as for many springs, there was an appropriation before Congress for $500,000 to start a program. CAA leaders, Congressmen, Senators—everybody concerned—favored the appropriation And then, when the over-all CAA budget went through, air marking funds were cut to $25,000.

I am not blaming anyone for this. Perhaps it was merely an oversight. But I am saying that it was contrary to the desires of every air-minded community from coast-to-coast, as well as to the best interests of the nation and its progress in aviation. The highway marking problem has long since been solved. Under Federal appropriations, highway-making and highway-marking went ahead hand in hand on the sound premise that to make the automobile usable and practical you had to make it easy for the driver to find his way from place to place. The same thing goes for the airplane double when the safety factor is added in the consideration. END

LINK TRAINER NETWORK

A NATION-WIDE network of Link trainer and ground course instruction schools, where embryo and veteran pilots can study subjects related to flying, has been planned by the Academy of Aeronautics and Link Aviation Devices. Six of these centers are already established on the eastern seaboard.

The ground school course is divided into four $35 courses in air navigation, meteorology, airmanship and aviation mechanics. Link time costs $8 an hour. Each of the schools will be an independent unit operating under direct franchise of the sponsoring companies. The schools, the sponsors say, can be established anywhere in the U. S. and can be provided military-trained teachers.

Aristocrat of personal airplanes

GLOBE SWIFT GC-1A

Manufactured under C.A.A.
Approved Certificate No. 766

The Swift

GLOBE AIRCRAFT CORPORATION • FORT WORTH, TEXAS

JOHN KENNEDY, *President*

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The network of Ranger distributors and dealers extending from Alaska to Florida, from California to New York and into Canada is stocked with genuine Ranger parts.

Distributors' and dealers' qualifications are the highest. Their sound Ranger background and experience assure your getting the best service and overhaul.

Clip out the list. Keep it with your log book and you'll know where to get needed parts and fast, careful service.

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Write Today for Full Details

RANGER DISTRIBUTORS* AND DEALERS

*Dixie Air, Inc.
Van De Graaff Field
Tuscaloosa, Alabama

*Pacific Airmotive Corp.
Merrill Field
Anchorage, Alaska

Southwest Airways
Phoenix, Arizona

*Pacific Airmotive Corp.
Lockheed Air Terminal
Burbank, California

Oakland Municipal Airport
Oakland, California
544 Seventh Street
San Diego, California
6265 San Fernando Road
Glendale, California

*Standard Aero Eng. Works, Ltd.
St. James
Manitoba, Canada

*Laurentian Air Ser., Ltd.
Ottawa Airport
Ottawa, Ontario, Canada

*Embry-Riddle Company
Chapman Field
Miami, Florida

*Schneck Engine Service
Washington Park Airport
Homewood, Illinois

*Badgett Aviation Company
Municipal Airport
Shreveport, Louisiana

*E. W. Wiggins Company
Norwood, Massachusetts
Van's Air Service
St. Cloud, Minnesota

*Pacific Airmotive Corp.
1628 McGee Street
Kansas City 8, Missouri

Johnson Flying Service
Missoula, Mont.

Western States Aviation
Reno, Nevada

Engine Air Service
199 East 2nd Street
Mineola, New York

*Buffalo Aeronautical Corp.
Buffalo Airport
Buffalo, New York

*United Aero Service
Delta Air Base
Charlotte, North Carolina

Piedmont Aviation Company
Smith Reynolds Airport
Winston-Salem, N. C.

*Harrington Air Service
Mansfield, Ohio

*Spartan Aero Repair
Tulsa Municipal Airport
Tulsa, Oklahoma

*Southwest Airmotive Co.
Love Field
Dallas, Texas

Precision Airmotive
Municipal Airport
Houston, Texas

Wichita Falls Air Trans.
Wichita Falls, Texas

Thompson Flying Service
Salt Lake City Airport No. 1
Salt Lake City, Utah

*Pacific Airmotive
Kent, Washington

RANGER AIRCRAFT ENGINES
Division of Fairchild Engine and Airplane Corporation, Farmingdale, Long Island

Before You Fly to Mexico

(*Continued from page* 21)

(the Mexican CAA). You may expect a delay there while the Consulate writes for your *permiso de vuelo* (your flight permit).

Clearance out of the United States will cost you $7.10, plus $2.10 for each *turista* (tourist card) other than your own. Those who are unfamiliar with clearance procedure often complain about the time it consumes. (Many prefer to pay a customs broker—several maintain offices at the Brownsville port—to get all papers ready in advance. The cost: $25 to $30.)

Attempts have been made recently by Leslie I. Hables, Civil Aeronautics Administration inspector stationed at Brownsville, to streamline the complicated procedure of clearing private planes into Mexico. In order to report to FLYING readers on current results of such efforts and on the *servicio-extraordinaria* "bites" one may expect below the border, the author made a typical round-trip flight from Brownsville, stopping at Tampico, Tuxpan, Mexico City, Victoria and Monterrey.

The trip was made in a Fairchild *Cornell* flown by King Cruse, operator of the San Benito (Texas) Flying Service. The open-cockpit plane was selected because of the advantages it offered for aerial photography. Any lightplane with a 300-mile range can make the same trip easily and safely.

Course selection followed a typical pattern set by aerial tours of Mexico. The longest hop was 275 miles—a leg on which a midway stop could have been made had we so desired. A ceiling of less than 10,000 feet puts one into Mexico City, the highest port on our tour. Upon completion of the flight, we tallied our tips for tourists. Here are the more important ones:

Flying in to the Rio Grande Valley, you may headquarter at any of the 15 airports which dot the area. Most of them have direct bus connections with Brownsville. To save time in getting clearance papers, follow the steps listed below:

1. Go to the Mexican Consulate's office, 1055 Elizabeth Street, S.E., in downtown Brownsville (open daily except Sunday from 9 a.m. to 2 p.m.). Answer brief questions (no birth certificate is required of native American born), and pay $2.10 for your *turista*. Your passengers, if any, must accompany you and get their own tourist cards.

2. Taxi or take a city bus to International Airport; check weather at the bureau atop the administration building.

3. Visit the airport manager's office. Advise Teofilo Crizell, Jr., manager, or Tom Benson, his assistant, of your plans and you'll get some helpful advice.

4. Drop in at the CAA office. On duty there are Inspector Hables, Mexican ACM Inspector Tomas de Leon, and Frances Galbraith, office secretary. Hables will help you make your flight plan after you have exhibited pilot's certificate and plane's airworthiness certificate. The inspector issues your foreign flight permit and Miss Galbraith, interpreting for de Leon, helps you in getting the Mexican *permiso de vuelo* in order.

(At this time you pay de Leon $5 to cover tolls on telegraph messages that will be sent when you leave. One goes to your first stop in Mexico, giving your expected arrival time, and another to his headquarters in Mexico City, advising that you are entering the country with proper clearance papers.)

5. Next go to the U. S. customs office in the administration building (open daily except Sunday from 8 a.m. to 6 p.m.). P. J. Huebner, inspector, will give you "outward" and "inward" manifests for aircraft which you are to fill out and return just prior to your departure. Leaving or arriving at hours other than regular U. S. Custom's office hours means an overtime fee of $2.75.

6. Finally, check at the office of M.

HERE'S THE WAY THEY SAY IT DOWN MEXICO WAY

Where is the office of the customs and immigration, please?
Dígame, señor: ¿dónde está el despacho del inspector de aduana e inmigración?
DEE-gah-meh, seh-NYORR, DOHN-deh ehs-tah ehl deh-spahchoh dehl eens-pehk-tóhr deh ad-dwah-nah eh een-mee-grrah-ceeyón?

When will he be here?
¿Cuándo llegará?
KWAHN-doh lyeh-gah-RRA?

Where is the American consulate?
¿Dónde queda el consulado Americano?
DOHN-deh KEH-dah ehl cohn-soo-LAH-doh Ah-meh-rree-KAH-noh?

Where is the airplane mechanic?
¿Dónde está el mecánico de aviación?
DOHN-deh ehs-TAH ehl meh-KAH-nee-koh deh ah-veeah-SEEOHN?

Can you repair my plane?
¿Puede componer mi aeroplano?
PWEH-deh kohm-poh-NEHRR mee ah-eh-rroh-PLAH-noh?

Can I buy gasoline and oil here?
¿Tiene gasolina y aceite?
TYEH-neh gah-soh-LEE-nah eeyah-SAY-teh?

What octane rating is the gas?
¿De qué potencia es la gasolina?
Deh KEH poh-TEN-seeyah ehs lah gah-soh-LEE-nah?

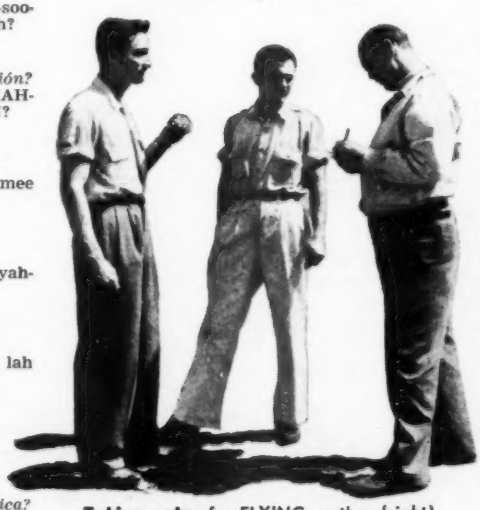
How much is it?
¿Cuánto es?
KWAN-toh ehs?

Where is the weather bureau?
¿Dónde está la oficina meteorológica?
DOHN-deh ehs-TAH lah oh-fee-SEE-nah meh-teh-or-rroh-LOH-hhee-kah?

Where is the rest room, please?
¿Dónde está la letrina?
DOHN-deh ehs-TAH lah leh-TRREE-nah?

I want a taxi, please.
Quiero un coche de sitio.
KYEH-rroh oon KOH-cheh deh SEE-teeyoh.

What is the fare to the Hotel Reforma? . . . to the airport?
¿Por cuánto me lleva al hotel Reforma? ¿. . . al aeropuerto?
Pohrr KWAHN-toh meh LYEH-vah ahl oh-TEHL Rreh-fohrr-mah? . . . ahl ah-eh-rroh-pooehrr-toh?



Taking notes for FLYING, author (right) tries his Spanish at a Mexican airport.

A single room with bath, please?
¿Tiene un cuarto sencillo con baño, por favor?
TEEYEH-neh oon KWAHR-toh sehn-SEE-lyoh kohn BAH-nyoh, pohrr fahvohrr?

A double room?
¿Un cuarto doble?
Oon KWARR-toh DOH-bleh?

Please call me at six o'clock. . . . at seven.
Llámeme a las seis, por favor. . . . a siete.
LYAH-meh-meh ah lahs SEHYS, pohrr fah-VOHRR. . . . ah lahs see-YEH-teh.

Where is a restaurant?
¿Dónde hay un restaurante?
DOHN-deh eye oon reehs-taow-rrahn-teh?

May I have the menu, please?
¿Permítame el menú?
Pehrr-ME-tah-meh ehl meh-NOO?

I want this.
Me quédo con ésto.
Meh KEH-doh cohn EHS-toh.

The check, please. (in restaurant)
Tráigame la cuénta.
TRREYE-gah-meh lah KWEHN-tah.

Where is the telegraph office?
¿Dónde está el despacho de telégrafos?
Dohn-deh ehs-TAH ehl dehs-PAH-choh deh teh-LEH-grra-fohs?

I do not understand.
No entiendo.
Noh ehn-TEEYEHN-doh.

Thank you.
Gracias.
GRRAH-seeyahs.

Garza, fuel control manager for *Cia Mexicana de Aviacion* (Pan-American affiliate in Mexico) which is adjacent to Huebner's office. Senor Garza will obligingly give you a letter of authorization to buy gas at any CMA pump. You will need it, too. Gas is often difficult to find south of the border and, even if you find 73-octane, you will prefer to use the CMA's 91-octane fuel. You'll pay an average of 47 cents per gallon for the 91-octane gas.

You're ready to leave? Take a final weather check; report to the airport manager's office and the CAA office, telling each that you are shoving off; stop in at U. S. customs where Huebner takes one copy of your outward manifest and escorts you to the immigration office where perfunctory questions are asked and you are cleared.

Go directly to your plane then and shove off. It is contrary to regulations to stroll around, chat with people, visit the coffee shop. You are, officially, on your way out of the U. S. A.

If you're like most tourists you'll want to see Mexico City as soon as possible. We flew down by way of Tampico, arriving there just 2 hr. 40 min. after hitting the green tower light on International's east-west runway at Brownsville. Our course was straight down the Gulf coast; altitude, 1,800 feet; speed, 105 m.p.h.; distance, approximately 275 miles.

You may want to stop at La Pesca, 160 miles south of Brownsville. If so, land on the beach or on the dirt strip near a small resort hotel about a mile inland. The hotel has accommodations for small parties, provides boats for Gulf fishing if you want to tackle tarpon, or rod and reel for surf casting—all at nominal charges.

We had been advised to get to Tampico between 9 a.m. and 1 p.m. to avoid "overtime" charges. At 12:10 noon we hit it wrong and paid $6.90 for *servicios extraordinaria* in addition to regular charges of $7.83 for customs and immigration clearance (customary fee at first port-of-entry stop in Mexico.)

We found that one should forget American currency and start thinking immediately in *pesos* and *centavos* (Mexican dollars and cents). The current quoted exchange rate is 4.85 *pesos* for $1 American, but nowhere will you get more than 4.80 for your dollar—sometimes you get less!

At Tampico, we paid a five-peso *derecho atirrizaze* (landing fee). Later we found that the fee is standard at every Mexican airport. We were met by Senors Rafael Fuentes, airport manager, and Pasqual Gujtierez, radio tower operator. Speaking good English, they explained that the port was CMA-managed, that gas and oil was measured in *litros* and that one U. S. gallon is about 4.67 *litros*. Their mechanics work on private planes if needed. The airport is modern in every respect and prominently air-marked.

An independent airport, *Campo Aereo La Barra*, situated three miles east of the CMA port, is operated by Felipe G. de Lara. He operates a flying school, makes lightplane repairs, sells 73 octane gas.

The customs business at Tampico or other ports-of-entry in Mexico is handled with dispatch. *Turistas* and *permiso de vuelo* are shown; original, duplicate and triplicate copies of the *turistas* are signed; the customs inspector detaches two, leaving the original with you to keep until you check out of the country. He examines your baggage casually, collects his fees and bids you *adios*.

Before we left for Tuxpan, 100 miles down the coast, Senor Gujtierez gave us the latest weather. No charge is made in Mexico for weather information, nor for wiring your expected arrival time to your next stop.

At Tuxpan, we easily picked up the new CMA airport with its broad, grass runways.

We wanted to get into "the City" for our first night in Mexico, so we fueled up with 91 octane and flew directly southwest, picking up altitude immediately. In 30 minutes we topped 9,000 and later we climbed to 11,000 in order to get high above thick, fleecy clouds.

Numerous Mexico City *Cub* and Aeronca pilots assured us that had we followed the north valley route across, going by Pachuca instead of heading over the hump, a 9,000-foot altitude would have sufficed.

H. O. Claywell, Piper *Cub* distributor in Mexico, had reservations for us at Hotel Coliseo. Rooms were 10 *pesos* each. Meals in the city are good and reasonable in price. Of course, there are de luxe places . . .

Things to do and to see in Mexico City are countless. One word of advice: shop before buying; ascertain what is dutiable.

Before leaving Mexico City's huge *Aeropuerto Central* we made out a new flight plan (required), obtained full and accurate weather and reported "out."

Back at Tuxpan, the station manager had his attendants service our plane and explained why they took their time: "We have a flight in from Tampico soon, I can't clear you from my field until it lands." After the CMA swooped in we took off for Tampico where we spent the night.

Taking off the next morning we circled the port and headed W.N.W. Our weather report of "slight haze" prompted King to "bird-dog" the railroad right into Victoria where we landed on the high-plateau airport and visited the city with Luis Pena, Jr., governor's secretary.

Going up a broad valley between mountain ranges to Monterrey was scenic but rough. Flight over the plains country just east of the direct route is smoother and Monterrey can't be missed.

Three airports serve Monterrey, scenic capital of Mexico. The military port (not open to civilians); the new *Parque Anahuac*, just north of the city, and American Airlines' *Campo Aereo del Norte*, 16 miles north. *Anahuac* should be used if you plan on staying overnight at Monterrey; if you are ready to check out of the country, go direct to *del Norte* where customs and immigration inspectors are stationed.

Inspection at *Campo Aereo del Norte* for outbound airmen is mostly formality —except the exchange of 38.20 *pesos* from your pockets to the cash till. There is no inspection of baggage, only a brief glance at the flight plan, *turistas* picked up—that is all. *Adios*.

Landing back at International Airport at Brownsville, we found inspection rapid and—with no dutiable items from Mexico —free. The inspectors are chiefly interested in seeing that no bugs or fruit come in; your word is good for your baggage and taxable items. We pulled out of the traffic zone and went up to Benson's office in the administration building. But he was ahead of us, having seen us come on the port below his office window, and was waiting with our "International Airman" certificates inscribed, signed, and delivered.

This certificate, handsomely printed, certifies that you, a private pilot, complied with all regulations in crossing the international boundary in a private aircraft. It's a nice souvenir which you've both earned and paid for.

Of course, you may choose any one of a great many different routes for your vacation over Mexico. At Brownsville, you may make your flight plan read:

15 YEARS AGO

FROM the July, 1931, issue of this magazine:

The Alexander Aircraft Co. entered the lightplane class with the D-1, a two-place high-wing monoplane powered with a 35-h.p. Continental engine.

The new model Arrow *Sport "85"*, manufactured by Arrow Aircraft & Motors Corp. and powered by a LeBlond 85-h.p. engine, had modifications in the wing and tail group design which increased its stability. Price: $2,985.

Two Army flyers took pictures of Chicago and its environs from 12,000 feet, developed the prints, fitted them together into a mosaic map and landed with the finished product—all in half an hour. The feat was unparalleled in aerial photography and comprised an important development for military operations, Army officials claimed.

Production of the new Liberty monoplane, which combined large-plane performance with small-plane price and operating cost, was initiated by Liberty Aircraft Sales and Manufacturing Co. Powered by a Szekeley 45-h.p. engine, it cruised at 78 m.p.h. and had a top speed of 90 m.p.h. Price of plane was $1,495 and it could be flown at a cost of $1 an hour for gasoline and oil.

Harold F. Pitcairn and associates received from President Hoover the Collier Trophy for 1930 for "their development and application of the autogiro and the demonstration of its possibilities with a view to its use for safe aerial transport."

Airmail planes were flying from New York to Los Angeles in less than 24 hours, with a 20-minute stop at Kansas City. Previous coast to coast schedule was 34 hr. 15 min.

A newcomer in the sportplane field was the States *Super Monoplane*, manufactured by States Aircraft Corp. It was two-place, powered with a five-cylinder 100-h.p. Kinner radial air-cooled engine. Price: $3,645, flyaway factory.

Plane Sale-ing..!

NO FINER NAMES COULD SELL THE "SEABEE"

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Makers of the Mighty Thunderbolt

"Monterrey, Victoria, etc." Or you may prefer to head straight for Victoria and then go either north or south from there.

Saltillo, west of Monterrey, should be avoided. Flying is tricky in that area. You would find yourself skirting steep mountain sides, threading narrow canyons and fighting air currents, down drafts. It's just no place for a lightplane.

At Tampico, it is feasible and a most enjoyable trip to continue down the coast to Vera Cruz, some 200 miles south. A huge CMA port and two smaller ports await the civilian flyer there.

From Mexico City it is an easy flight down to Acapulco, 225 miles south. The resort is fast getting the play from other Mexican cities and the two airports there are comparable to CMA's at Tampico.

Also, while you're in "the City," you should check with Claywell, "Buffalo" Durkin, Piper dealer, and Jorge M. Mosser, operator of a lightplane repair shop at *Aeropuerto Central*. Any one of them will advise you regarding a side trip to famed Paricutin Volcano, which is very active now. If they approve your going, it should be a "must" on your Mexican air vacation. END

Flight Without Pilots

(*Continued from page* 41)

which was developed for precision bombing. The electronic autopilot was brought to a high standard of perfection by (to name one organization) Minneapolis Honeywell, which company manufactured more than 35,000 units during the war and has developed an even simpler unit for commercial operation.

Sperry engineers, too, have developed an electronic autopilot, but all references here apply to the M-H autopilot, whose engineers provided the basic information for this article.

The electronic autopilot (see FLYING, May, 1944) consists primarily of a vertical gyro, a directional gyro, a rate gyro, a control panel, an amplifier and servo electrical motors attached to elevators, ailerons and rudder. The vertical and directional gyroscopes always remain pointed in a fixed direction but the gyroscope cases tilt with the aircraft. Thus, as the airplane tilts, the gyroscope remains stable and measures the angle and amount of tilt of its case by a "wiper." The wiper is affixed to the gyroscope and slides across an electrical device known as a "potentiometer" which is fixed to the gyroscope case.

The movement of the wiper across the potentiometer as the plane tilts sends an electrical impulse to the amplifier which boosts the signal and relays it to the proper servo motor. The motor actuates the controls to correct the tilt. Conversely, the airplane can be flown by turning knobs which actuate the servo motors to make any maneuvers necessary.

The rate gyro provides a control signal depending on the rate at which the plane is changing its heading. This signal prevents over-correction and makes the control system stable and free from hunting. If a gust of wind sends the plane off course, the rate signal will also call for a correction immediately, without waiting for appreciable displacement to take place. This insures a smoother ride.

The autopilot is more sensitive, stronger, and has faster reactions than the human pilot. Here are some of the things it can do:

It can detect the slightest roll or pitch faster than a human pilot possibly could, and apply corrective control before the human pilot is even aware of the need for it.

It can make perfectly co-ordinated turns.

It is constantly ready to be engaged or disengaged by the push of a button.

If one engine should fail the autopilot not only will maintain a safe airspeed but also will raise the wing on the side of the dead engine. It will also hold the set course.

All these it can do—but these, by themselves, are a long way from automatic flight. A plane equipped only with an autopilot cannot take off, fly, navigate, avoid collisions, or land by itself. Without other mechanical aids the autopilot needs the brain of a human pilot to supply changes of direction or attitude and any other adjustments requiring judgment.

If we are to achieve automatic flight, therefore, we must solve all these additional problems: (1) automatic take-off, (2) automatic navigation, (3) automatic collision warning, (4) automatic throttle, (5) automatic altitude flying, (6) automatic landing.

Dr. Waldo H. Kliever, director of research for Minneapolis Honeywell, points out that the electronic autopilot provides the basic link in solving these problems. The brain of the autopilot is an electronic computer which can be designed to interpret any electrical signals and convert them into energy to operate the plane's controls.

It is necessary only to connect various flight instruments to the autopilot's computer to make it guide the plane through any of these essential maneuvers. Such flight instruments have already been developed and been proved successful. They will be better in the future, of course, but they are here today.

The first problem of automatic flight—take-off—is so similar to that of landing that the two will be discussed together later. Problem 2, therefore, is *navigation*—only it doesn't seem to be much of a problem any more.

On the airways, the radio beam provides the answer. A radio receiver is connected with the autopilot and simply tuned to the maximum field strength of the radio beam. The signals feed into the computer and fly the plane directly down the beam. Off the airways, the radio compass can be tuned to any radio station and will point toward it. Signals from the radio compass fed into the autopilot, then will fly the plane toward that station. The problem becomes more complex, however, in navigating between two points not connected by radio beams or stations.

For such cases, radio equipment has been developed whereby a course can be pre-set with relation to the distance between the plane and any given radio station and the azimuth angle of the plane's position from that station. A radar instrument measures the distance to the radio station, and the electronic signals passing into the autopilot computer keep the plane on any pre-set course.

Requirement 3, an *automatic collision warning device*, is comparatively easy to work out. Even before the war, the Civil Aeronautics Administration was working on a visual collision warning indicator for aircraft. A dial on the dashboard shows the location of aircraft ahead of the plane at different levels. Signals from such a device could be fed into the computer to cause the plane to pull out and around an overtaken plane —or perhaps a red light or horn warning

The GOLDFISH CLUB

The Goldfish Club was formed in order to give recognition to the thousands of pilots and aircrewmen who have ditched their aircraft or bailed out at sea and have saved their lives through the use of life jackets or dinghies. Army, Navy and Civil Air Patrol personnel are eligible for membership. To apply, the following information should be submitted to the American Secretary, Max Karant, Managing Editor, FLYING, 185 North Wabash Avenue, Chicago 1, Illinois:

1. Name, rank and serial number
2. Service address
3. Home address
4. Date and location of incident
5. Description of incident
6. Signature of applicant
7. Signature of commanding officer

A listing of the Club members, a regular feature in preceding issues, is continued below:

199. Boseck, Beryl H., A
200. Bonzell, Vernon L., A
201. Waddon, Jack R., A
202. Owens, Joseph W., A
203. Philbrick, Arthur P., A
204. Beuter, Oren A., A
205. Neuendorf, Roy A., M
206. Davis, George I., A
207. Popoff, William, A
208. Spencer, E. H., N
209. Sparrow, W. Herbert, N
210. Holle, Walter A., A
211. Clark, Jackson W., N
212. Miller, Berwyn J., N
213. Mathers, John F., N
214. Simes, Hoyle A., N
215. Marker, Robert J., N
216. Rowe, Herbert C., N
217. Standring, F. E., N
218. Armstrong, Richard D., M
219. Woltz, Jack, M
220. Morgan, Donald D., M

A—Army; N—Navy; M—Marine.

H. D. INGALLS... *veteran maintenance chief American Airlines pre-war, and for ATC at Northeast Airlines during the war... now General Manager of the new Bluegrass Airlines, is making an extraordinary operating record with his "progressive maintenance."*

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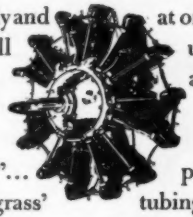
With only two converted Cessna transports powered by wartime Jacobs engines ... Bluegrass Airlines gives Kentucky statewide service, links seven cities with regularly scheduled week-day flights, logs 960 miles daily and 5760 miles per week! And will shortly add Sunday operation with the same equipment!

How do they do it?

"Progressive maintenance"... the system developed by Bluegrass' headman H. D. Ingalls while in charge of ATC maintenance on Northeast lines during the war. Bluegrass' trim planes on alternate days end their trips at Bowling Green, the company's base, where a veteran AAF crew checks and overhauls some portion of plane and equipment each night on a rotating schedule. The ships are kept in service without the loss of flying time.



The Jacobs R755-9 engines fit into this tight operation program like web feet on a duck... maintain schedules at only 1850 rpm, 58% capacity... use as little as 14 gallons of fuel and only 1 quart of oil per hour.

The compact rear case and unique accessory drive unit permit quick, easy inspection of tubing, wiring, control linkages, and facilitate engine change, reduce line maintenance details. For dependable, low cost performance with minimum maintenance, Ingalls rates the R755-9 as one of the most satisfactory engines he has ever known ... believes that his current 650-hour period between majors could be extended without undue wear or safety infringement.

Today the new R-755A is an even better Jacobs... because of intensive research, improved metals, quantity production experience... weighs no more, but delivers 33% more power — 300 hp at 2200 rpm — is more sparing of fuel and oil... is the most efficient non-supercharged radial in its power class available today... Ready for delivery now, too! Inquiries invited ... Jacobs Aircraft Engine Company, Division of Republic Industries, Inc.

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will be sufficient to cause the pilot to assume control.

Automatic collision warning would take care of a large number of air traffic hazards, but if future air traffic should be so heavy as to demand completely automatic traffic control, Glen A. Gilbert, chief of the CAA's air traffic control division, has suggested a sort of automatic "block signal system."

Marker transmitters would throw a screen across the airways at "block signal fixes" 10 to 15 miles apart. Planes flying the airway would set up a "hold" light for a succeeding plane at the same level. This "hold" signal would not be cancelled until the first plane had climbed or descended to the next level or had passed to the next fix along the block. Thus, signals would be set up automatically to warn planes occupying the same block of airspace. Gilbert, an expert on air traffic control, believes that pilots themselves must take on increasing responsibilities in avoiding collisions. They would be aided greatly by a warning indicator.

Additional requirements for automatic flight are *ability to hold constant altitudes and airspeeds* (requirements 4 and 5). Experimental equipment installed in Minneapolis-Honeywell's *Delta* airplane has proved to be extremely efficient. A graph of one recent trip between Minneapolis and Fargo showed the *Delta* had maintained its altitude for the entire distance within plus or minus 15 feet. The control unit is attached to a pressure altimeter (which works like an aneroid barometer) and fed, of course, through the computer to the autopilot controls. Another new device, originally developed for pilotless aircraft, maintains a constant airspeed, even if there is loss of power. The device is based on the velocity-pressure indications of a pitot tube which, of course, is standard airspeed equipment. Again the signals are fed through the autopilot computer.

Automatic landing, the most difficult in the entire list of requirements for automatic flight, has been solved simply by feeding into the autopilot the radio signals of the CAA's conventional blind landing system.

The CAA manual system was developed before the war but was delayed so that even yet it has been installed at only a few commercial airports. It is being extended rapidly, however. The system provides airfield transmitters which send two beams to a receiver installed in the airplane. One of these, the "localizer" beam, is a vertical beam which lines up with the center of the runway. The second, the "glide path" beam, is a horizontal beam which describes the actual glide path down which the approaching craft must fly to contact the runway.

In manual blind landing, these two beams are picked up by a receiver in the plane and relayed to a dial on the instrument panel. The dial shows two needles mounted at right angles to each other. One needle is tuned to the "localizer" beam, the other to the "glide path" beam. The pilot has no visibility outside the plane but flies manually so that the needles remain centered. Any deviation of either of the needles tells the pilot that he is off course and how much.

The new automatic landing system utilizes these same CAA landing beams—but with a difference. The needles are actuated, of course, to provide a visual check for the pilot. But the beams are also piped to the autopilot's computer which interprets the signals and energizes the control system to keep the plane lined up directly with the beams.

Minneapolis Honeywell calls this automatic blind-landing system, somewhat prosaically, the "automatic approach coupler." It was used during the latter part of the war and has been tested successfully in more than 1,000 low-altitude approaches. Ordinarily, it guides the pilot merely to within sight of the ground —sometimes within less than 10 feet— where he takes over to land visually. Many wheel landings have been made without the pilot touching the controls, however.

Completely *automatic take-off*, the first requirement on our list, is an arguable matter. Many pilots see no particular need for automatic take-off since, once the plane is off the ground, it can be switched to autopilot almost immediately. This explains why strictly automatic take-off equipment has not been developed. It probably would be a simple matter, however, to reverse the automatic landing mechanism and use it for automatic take-off, flying up the glide-path instead of down it.

What is automatic flight like, given its present stage of development? Russell H. Whempner, sales manager of Minneapolis-Honeywell's Aeronautical Division and himself a pilot, describes such a flight in instrument weather from Minneapolis to Chicago. We will not try to do anything which has not already been proved out.

One of the first things we notice is that we still have quite a few duties to perform. Our equipment may be largely automatic but still needs a little nudge from the cockpit.

We start the engine and warm it up. As soon as it is started we throw the autopilot switch so that it, too, will warm up. One minute after the autopilot switch has been turned on, glowing lucite rods inform us that the gyros are fully erected and the autopilot is ready for instant use.

The directional gyro is caged on center but is fully operating. We taxi to the end of the runway preparatory to taking off into the southeast wind. We get radio clearance for take-off and are given a clear channel into Chicago at 6,000 feet. We fly the plane off the runway ourselves but after take-off we find ourselves on course and set the throttle at sufficient r.p.m. to climb 300 feet per minute.

We reach over and push the center button to engage the autopilot. The mechanism now takes over and will fly the course automatically. There are still manual operations to perform, however. As we approach the 6,000-foot channel we adjust the elevator trim con-

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Compare These Features:

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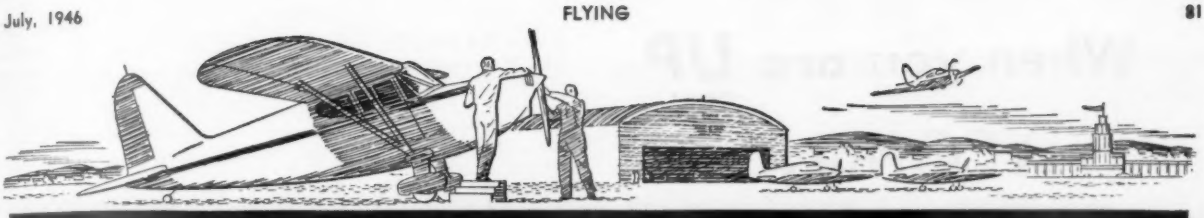

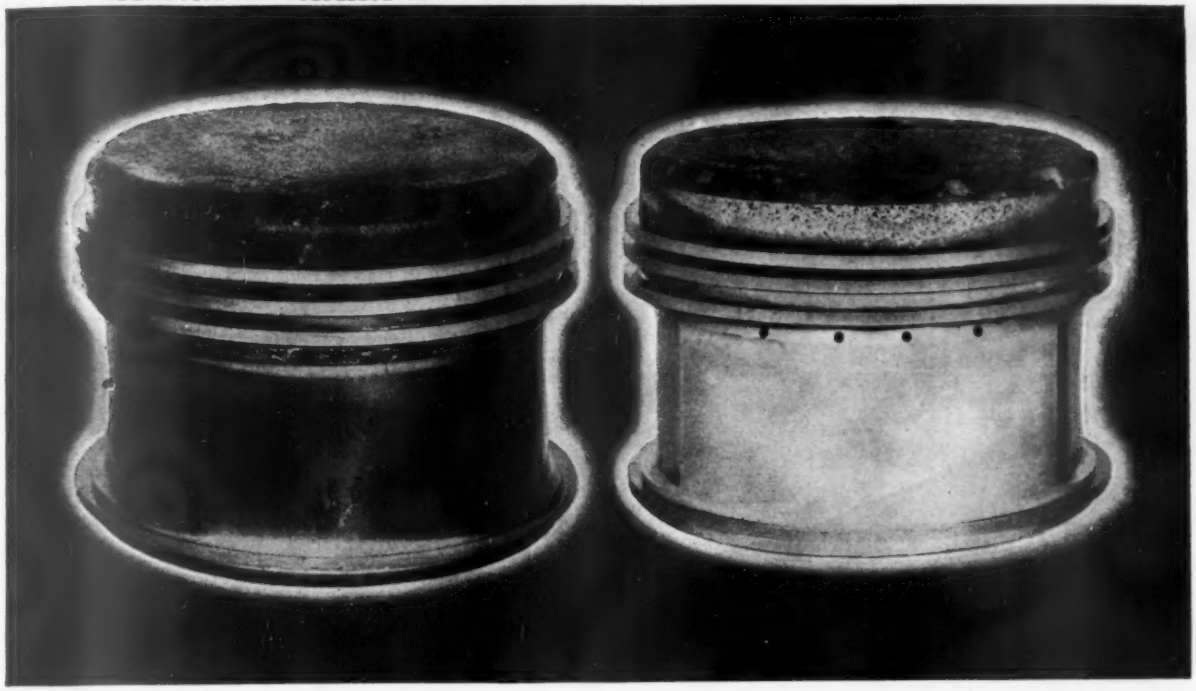

Which piston was used longer?

If you guessed the one on the left, try again.

Actually, the cleaner of the two pistons was in use twice as long as the carbon-coated one. The difference was simply that the carbon-coated piston came from a test engine lubricated with a *straight,* high-quality mineral oil.

The clean piston came from an engine lubricated with Standard of California's *IMPROVED RPM Compounded Aviation Oil.*

RPM Aviation Oil contains a detergent (which means cleansing agent) that "washes" carbon, gum and varnish deposits off pistons . . . keeps them clean. Another compound makes RPM oil cling to hot spots that other oils leave bare . . . another prevents foaming, assures better circulation . . . still another is an oxidation inhibitor.

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Address_____

trol on the autopilot control panel until the plane has levelled off. We can determine when we have attained level flight by studying the rate of climb, artificial horizon, the altimeter and so forth. Then we push the constant-altitude button—or, it would be possible to pre-set the cruising altitude before take-off so that the plane will automatically level off at the desired altitude.

In leveling off, we cut the power back to cruise, adjust the propeller, and notify ground control that we are on course at 6,000 feet. Then we tune in the radio directional finder or the range beam receiver to the first radio range station, La Crosse, Wis., and turn the switch to radio range navigation and the plane automatically assumes proper heading.

So far, the manual operations are primarily matters of judgment. Mechanically, the autopilot is doing the actual flying. The autopilot holds the altitude almost perfectly as the radio compass points first itself, and then the plane, directly at La Crosse.

During the flight we listen now and then for check purposes, and as we approach La Crosse we listen until the signal builds up to the cone of silence over the La Crosse station. As we go over this maximum signal point we tune in to the next radio range station at Lone Rock, Wis. If we had gone to sleep and not switched to Lone Rock, our plane would have continued to circle the antenna at La Crosse until we woke up—or ran out of gas.

It would be a simple matter to develop a device to switch automatically to the Lone Rock signal or one which would give an automatic indication when we were over the La Crosse station, but so far it has not been needed. We proceed to fly to Lone Rock automatically after we tune in from La Crosse. Over Lone Rock we tune in on Rockford, Ill., and there we tune in on Chicago.

The radio tells us that the wind at Chicago is from the south so we come in north of the field and, to be unorthodox (it will probably be permitted by the time we make this flight anyway), we are to make a right-hand turn.

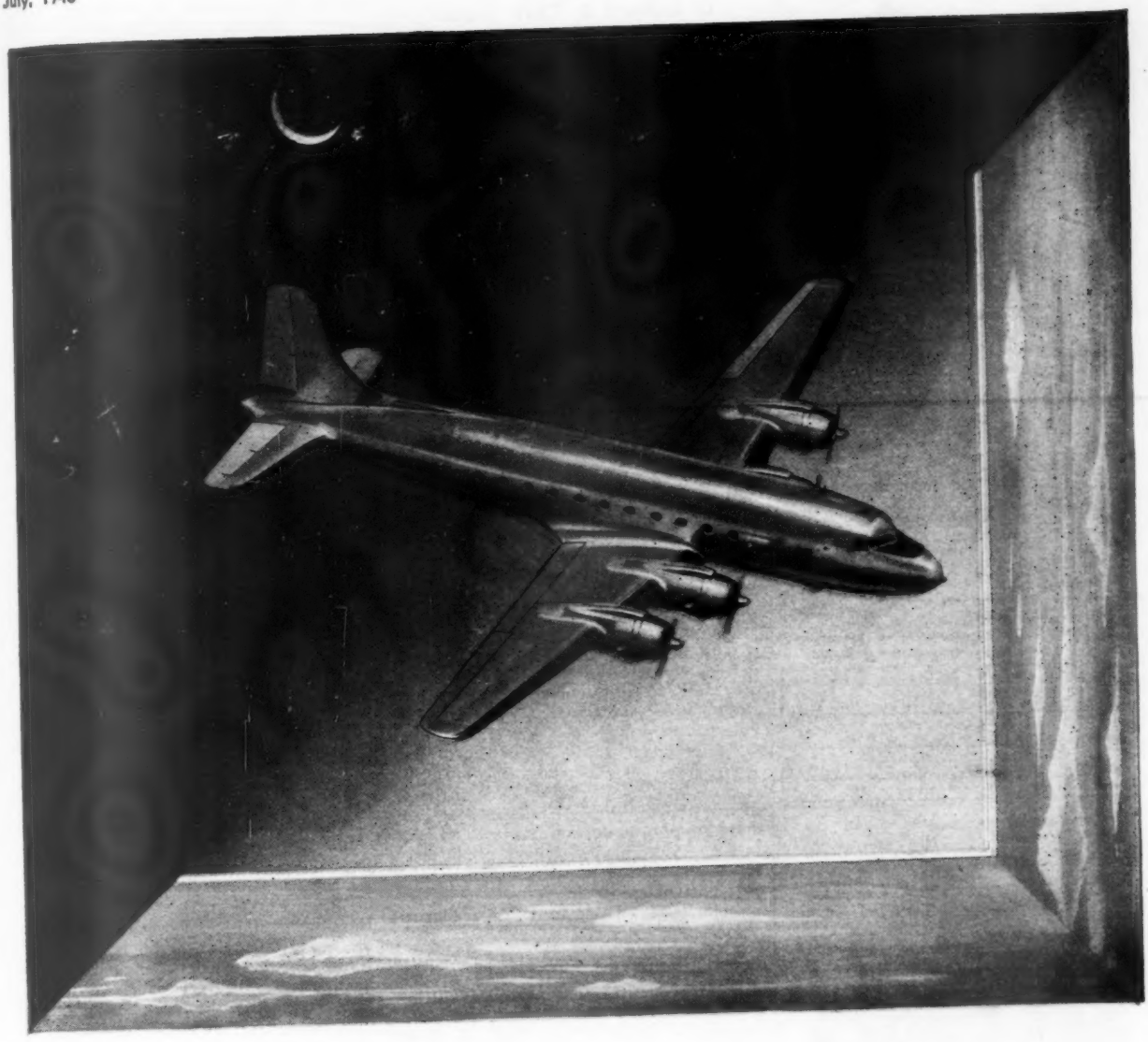
A flashing indication on our instrument panel indicates we are passing over a marker beacon, which means we are within range of the airport landing approach system. When we see this signal we throw a switch on our automatic landing device and take the autopilot out of control of the radio range, and put it under control of a localizer beam. The plane turns and points directly at the center of the runway we are to come in on.

Now we are pointing at the center of the runway but we are still at 6,000 feet. We fly on, until the glide path pointer of the indicator is on center, which means we have intercepted the glide path beam. We switch to glide path and come under the influence of both localizer and glide path beams. Our radio mechanism activates the autopilot and we line up directly with the two beams and ride down the glide path for an almost perfect landing.

Meanwhile, we have checked the CAA-developed manual blind landing instrument. We glance at it occasionally and are pleased to note that the two hands remain absolutely centered. Our autopilot is flying us on a perfect course. Then we get another flashing light from a radio fan marker. It means "reduce power." Later, still another marker signal flashes on. This signal means "wheels and flaps down." We perform both of these operations manually—though these signals, too, could be piped into the autopilot which then could perform them automatically.

Finally we go over the fence marking the airport boundary and get our final flashing light. It means "pull back the throttles." And so we land. If we wish, we can switch the autopilot off and land manually, or we can leave it on and land blind. We have our choice.

We taxi down the runway through the fog and pull up to the unloading apron. It's been a mechanically perfect flight and 90 per cent of it has been fully automatic. We have used our piloting skill to some extent but our automatic devices have relieved the pilot of those routine duties which they can do better than he can. They have given him more time to "supervise" the plane—to be captain of his ship. There's nothing Buck Rogerish about it at all. It isn't 500 years off. It's here today for the airliners. And if, for cross-country lightplanes, it is here tomorrow, we will have entered, for certain, the age of flight. END



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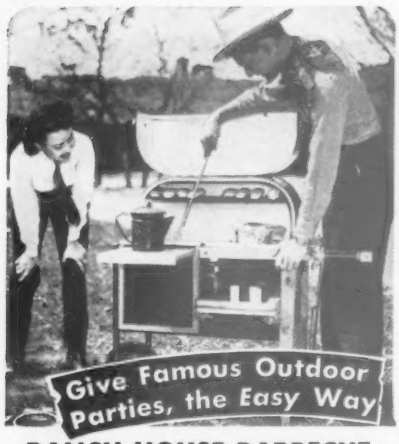

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Is Bikini a Fair Test?

(*Continued from page* 17)

to determine the effects of atomic explosives on heavily-armored naval craft. They pose two pertinent questions:

1. Should we spend more billions on a seven-ocean Navy—one that can be sunk by airpower?

2. Or should we support the world's mightiest Air Force and do some additional spending on research and development of guided missiles and rocket weapons?

The right answer means the difference between defeat and victory in any future conflict.

Once before we had the same decision to make. It was back in 1921 that my close friend and superior officer, Brig. Gen. William Mitchell, then Chief of the U. S. Air Service, told the world that military aviation—even then—was prepared to sink any battleship afloat. Official brief cases today are full of the same sort of "on-paper" evidence that stripped Mitchell of his rank and prestige—despite the truth of his claims. Again the Navy has "bravely" accepted an unoffered challenge to prove that their powerful ships can withstand anything—even the atomic bomb. And again they are going to do it their way. The game (if you can call it that) is to be played with the Navy's own deck of cards and according to the Navy's own set of rules. Here are the indications:

A Navy man, at this writing, is in complete charge of the trials. He is Vice-Adm. William H. P. Blandy, Deputy Chief of Naval Operations for Special Weapons and Guided Missiles. Admiral Blandy is in supreme command of the special task force—the Army, Navy and Air—which will participate in the tests. He is the director. He will see to it that everyone abides by these strict rules:

1. One *Superfortress* in early July will fly from its Kwajelein Island base and drop an atomic bomb (one) that will be exploded several hundred feet in the air above the target ships placed in close formation (after insistence by the Air Forces) in the secluded cove near Bikini Atoll.

2. Later the Navy will load an atomic bomb on an LST and tow it among the ships where it will be exploded on the surface.

3. Sometime still later, in 1947 perhaps, a third bomb will be exploded in deep water, when a means has been devised to do so.

It is small wonder that Maj. Gen. William E. Kepner, who is in charge of the air units participating, spoke with his tongue in his cheek when he was interviewed concerning the tests.

"How many planes will take part?" he was asked.

"The air will be about as full of planes as the Admiral wishes," he replied drily.

After it's all over we still will not know what would happen if the naval craft were plowing toward an invasion and were met by a whole squadron of super bombers with atomic bombs in their bellies, each with a specific ship target. The tests will not show what the results would be if a salvo of rocket-propelled atomic missiles were launched from coastal ramps and guided by radar, television or metal-seeking warheads—one robomb for each target. We will not know the effect of flying these missiles under the wings or in the bomb bays of bombers far out to sea, picking up the task force with radar and releasing the lethal loads with deadly accuracy. The question, "How long would navies stay afloat when attacked in this way?," will remain unanswered despite the fact that we know already the next war will be fought in just such a fashion—that even now our enemies may be planning this kind of action.

Our foremost scientists already have pointed out to Congress that an atomic bomb will be more destructive under water than in the air. A single bomb exploded at the correct depth could sink a fleet disposed as was ours at Pearl Harbor. And since they are the only ones who know anything about this fearsome weapon we have no reason to dispute their claims. Yet we are treating their prophecies just as we did Mitchell's after the first World War. One of General Mitchell's own reports states:

"Our experiments had gone so far forward in the fall of 1920 that I was able to announce definitely to Congress that we could destroy, put out of commission, and sink any battleship in existence or any that could be built. This resulted in an interesting controversy that merely showed how any innovation, particularly in methods of warfare, is kept down by the more conservative elements. It is an amusing fact that the Secretary of Navy at that time announced that these things could *not* be done and that he was willing to stand on the bridge of the ship while we bombed it."

Although the astute Secretary of the Navy never did stand on the deck of his battleship during an aerial bombing, the Navy accepted the challenge and made available German prizes of war for the tests. Ironically, the Navy has again provided some German vessels and some Jap junk for the tests at Bikini. But then, as now, the Navy drew up the conditions under which these vessels were to be destroyed. Mitchell had very little voice in the matter.

Navy insistence that target ships be anchored on what is known as the 100-fathom curve, which lies about 75 miles out to sea from the mouth of the Chesapeake Bay, put Mitchell's land-based bombers at a disadvantage. Planes couldn't fly as far in those days and over-water flights in landplanes were considered extremely hazardous. The tests, as Mitchell pointed out, could have been staged at a location where his air-power would have had a better fighting chance.

The Navy had a perfect excuse for the action. They were, Naval spokesmen explained, merely following the terms of an international agreement with respect to prizes of war which required that such ships, after a certain period, were to be sunk in 100 fathoms of water. It was pointed out also that this spot was located so that the greatest number of Con-

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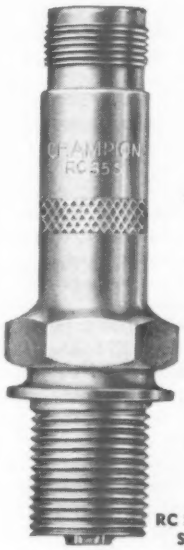

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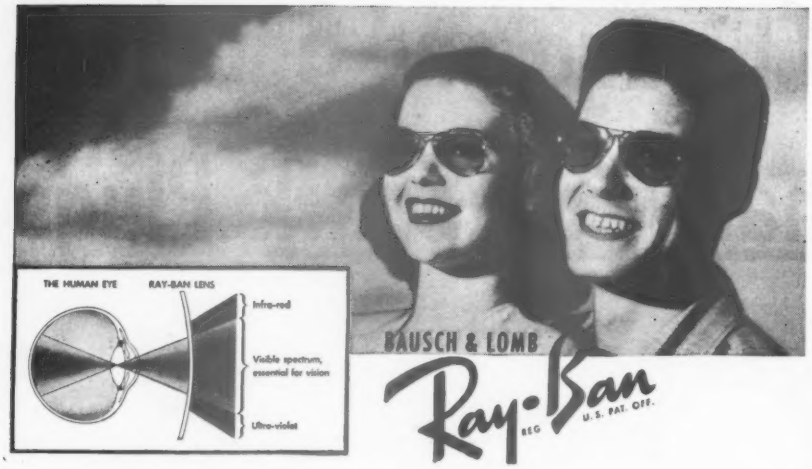

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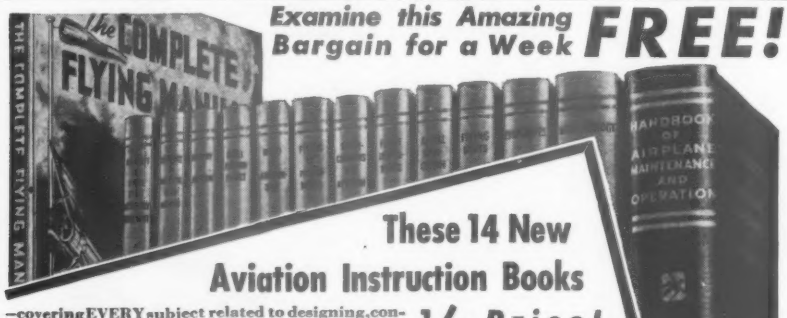

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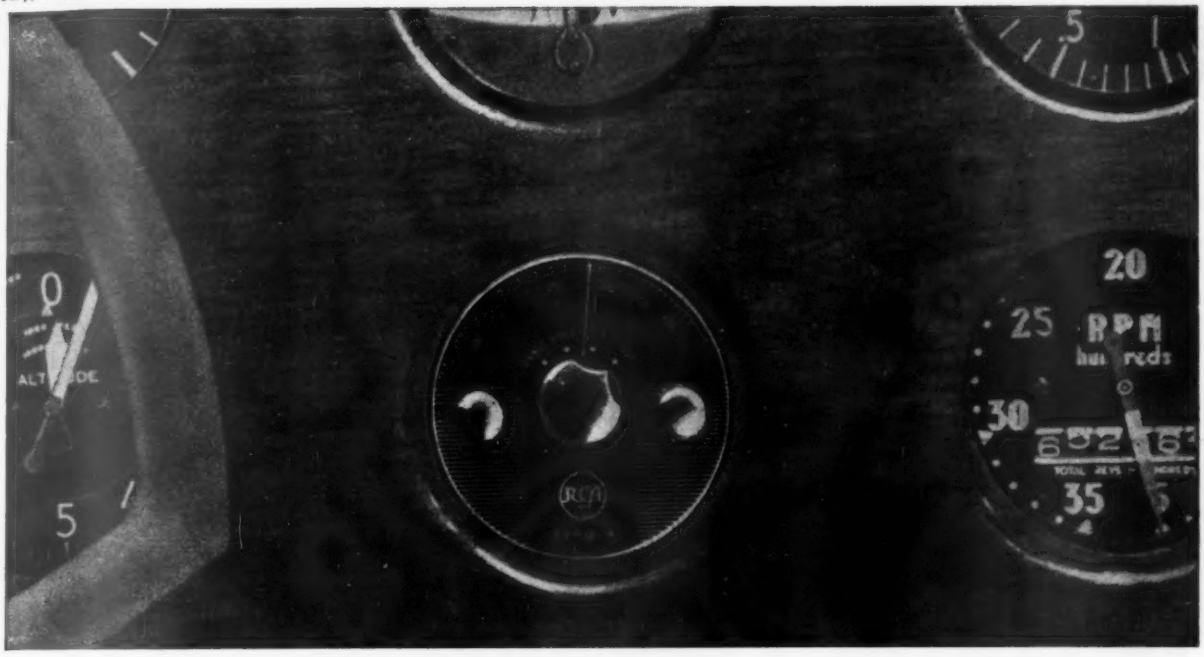
gressmen could conveniently attend the trials. (Haven't we been told that the Bikini Atoll atom tests were postponed in order that more Congressmen might see the job?)

Those first tests were run in deep water even though General Mitchell pointed out that "Our bombs would not have so great an effect as they would if the water were shallow. In shallow water, if we can burst bombs against the bottom, they explode up and against the bottoms of the vessels with very much greater force than where the water is deeper, in which case there is no destructive force upward against shipping." *Could there be any significance in the fact that the third atomic bomb is to be exploded in deep water? Why not in the usually-more-shallow waters of a harbor where enemy ships are at anchor as ours were on that disastrous morning of December 7, 1941?*

Mitchell was up against other obstacles which seem strangely familiar today. The heavy Martin bombers he was using were fresh from the factory; his pilots had never flown them before and at first these men were a little nervous flying these big new planes with their full loads. It took an extensive training program to accustom their crews to the peculiarities. The Navy laid down the rule that only one type of weapon was to be used in the first maneuvers—high explosive bombs. The bombings were to be progressive; that is, smaller bombs were to be dropped first and then the bombs were to be increased in size until finally 2,000 pounders were permitted. The result was that the Navy got the first big headlines which said the bombs didn't sink the ships; the small stories that followed told of the big bombs that blasted the ships from the water. The Navy also reserved the right to stop the bombings at any time so they could make observations.

The results of the trials were even more overwhelmingly in favor of airpower than Mitchell himself had dared hope. Mitchell's fighters, light bombers and heavy Martins, in that order, went to work on the German torpedo destroyer *G-102*. In a matter of minutes the ship was on fire, then it broke in two and sank down out of sight. The next target was the cruiser *Frankfurt*. Three-hundred-pounders did great damage, and the Navy attempted to stop the test. But 600-pounders sank the ship before the control vessel could call off the attack. Finally came the bombing of the battleship *Ostfriesland*. Large 2,000-pound bombs hit alongside and on the deck of the ship causing serious damage. Fragments of the battleship were blown great distances. The bombers had injured the ship so severely that had she been equipped with ammunition and had had steam in her boilers, she probably would have been destroyed. As it was the bombers went back the next day and sank her. Thus ended the first great air versus battleship test that the world had ever seen. It conclusively proved the ability of aircraft to destroy ships of all classes on the surface of the water.

The startling thing about the whole affair is that *nothing was done about it.* Navy men did everything they could to



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Vital panel space is conserved by mounting the lightweight IF-Audio and power units in any out-of-the-way place, such as under a seat. All the operating controls are located on the instrument panel. Choice of three power supplies is provided—dry battery, or one of two vibrator units for use with 6, 12, or 24-volt storage batteries. Inherently self-shielded, the AVR-104 will operate satisfactorily in most aircraft without costly shielding of the ignition system.

Integral part of a new postwar family of aircraft radio units—all in the same three-inch diameter, panel-mounting instrument case—the AVR-104 is the ideal equipment for all types of private aircraft.

You'll want to know more about this new receiver—for a lot more performance in a lot less space it's the logical choice.

For detailed specifications and a complete story on the new RCA lightplane system, *write today*—Aviation Section 34-G*, Engineering Products Department, Radio Corporation of America, Camden, N. J.

Power Unit (left) and IF-Audio unit, shown mounted beneath plane seat. The power unit illustrated, the AVA-127 type for use with 6, 12, or 24-volt storage battery, will also power the new RCA Aircraft transmitter AVT-114 or any transmitter requiring similar power input. For receiver use only, the smaller AVA-128 power unit is available.

AVIATION SECTION

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minimize the facts. They said the target ships were obsolete craft, that the bombs couldn't be so destructive against the new battlewagons of the deep they were planning. They screamed that antiaircraft action from the ships would ward off any bombers and shoot them down before they could strike the death blows. They even got tangled up in their own rules to say that the heavy bombs wouldn't have sunk the ship if it hadn't been for the beating it took from the small ones!

With this sort of wishy-washy propaganda the Navy exponents succeeded in getting a gullible public to stick to the big guns of its Navy. Despite failure of naval vessels against airpower, the Navy got $503,154,816.63 out of the fiscal budget in 1922 as against the Air Service's $19,200,000. The appropriations stayed proportionately the same until Jap planes repeated the Mitchell performance at Pearl Harbor and again against the modern well-armed battleships *Prince of Wales* and *Repulse*. Not until the blood of American youth was spilling over the highway did we remember the wrong turn we made back at the Billy Mitchell crossroads.

There is no intention here of detracting in any way from the glorious job done by our Navy personnel in the battles won. Words of praise are inadequate to describe their courage and fighting ability. The records cannot be altered. Ship against ship, our Navy beat hell out of its opponents. But it is still a question as to whether Jap airpower didn't win its round. And the Jap air force, according to our technical intelligence men, was a *fourth-rate* power. Our Navy wouldn't be afloat today if it had been facing the B-29s and the other fighting planes that we threw against the Japs or the diabolical kind of war the Nazis were starting during their dying days.

Generals Arnold, Spaatz, Doolittle and Kenney, the strong proponents of modern airpower, have warned us time and again that this is the sort of war which threatens the world today. We know from Hiroshima and Nagasaki that life cannot survive the terrific blast and heat of the atomic bomb explosion. What if the test ships should stay afloat—shall we enter some future conflict with no better equipment than several hundred ghost ships?

It is a forgone conclusion, in view of the way the atomic bomb trials are set up at present, that some ships will survive. And we will undoubtedly hear that same plea for existence from the Navy braid—only this time it will be louder than ever before because the fight will be for the life of the service. It will come from some of the same type of anchor-minds that wanted to stand on the deck of the battleship while Mitchell's planes sank it. This time they should be made to do it. Let's face the facts which may be camouflaged by the atomic bomb tests. The Navy is finished, dead. Its primary job in the next war will be logistics and then it will move in *after the enemy is beaten*. If we must have some kind of a combat sea force it will comprise floating rocket-bomb launching platforms and control stations that can go in, under complete air cover, close to the enemy's shores and pepper his cities with guided V-weapons like the Germans were scheming to use against New York City. But for the sake of our lives, let's not allow anyone to talk us into building the same kind of a Navy we have today. No matter what the scoreboard reads after the atomic-bomb tests we must keep repeating that, with enough bombs and enough planes pitted against it, the Navy in any future war is a dead duck.

This is not to imply that we should dispense with the tests at Bikini Atoll. We must learn from actual tests more of the secrets of the atomic bomb. What effect does it have on aircraft? Does it seriously affect radar equipment? How does it affect clothing, food, vehicles, oils, gasolines? Will it cause great tidal waves that might race treacherously over our own shores?

FLYING SECRETARY

PERHAPS presaging things to come, former WAC Capt. Ruth Saltzman, of Washington, D. C., was flying secretary to Col. Clarence Irvine, deputy commander of the Strategic Air Force.

In October, 1944, she flew with Colonel Irvine to Saipan in a *Fortress* to become the only woman of the 20th Air Force. On that flight, her "office" was in the bomb bay. Later, when the Colonel used *Superfortresses*, her quarters were in the bombardier's Plexiglas compartment.

Only by testing can we answer these questions.

We must be provided the funds to run many such tests. But let's not hide behind the expensive and meaningless excuse that this is a test against seapower; we already know we can sink battleships, A-bomb or no A-bomb.

There are far more important things to learn. It may be that the explosion over water will disrupt our Loran navigation systems and cause plenty of interference with our expanding airways commerce around the world. There is the possibility that we will be able to pick up the atomic bomb explosions with radar. If this is true it may be that we can trace an A-bomb exploded anywhere in the world to its base.

We may be rushing into these tests, inadequately prepared. Already we have been forced to use on-the-shelf equipment. The B-17s which will photo-record the results are outmoded aircraft—but new to their pilots who aren't familiar with the radio-control mechanisms. A special rush training period had to be provided to teach airmen the tricky technique of controlling the pilotless planes from mother ships. It all smacks of the old show when Mitchell's pilots had to use equipment with which they were not familiar.

It is high time we changed the scenario and the directors. We know that one test isn't going to teach us much, especially if it is to be run under restrictions. We should run tests as the Air Forces did at the Eglin Field proving ground when they had to find a way to destroy the German robomb launching ramps along the coast of France. They got the right dope on the launching sites from Intelligence and they built replicas, complete in every detail. Then, they threw the works at the ramps. Every kind of a bomb from every kind of a plane went crashing into the concrete rampways. Finally they hit upon the right combination—a gasoline jelly bomb which penetrated, burned and cracked the tough targets. They found the best method was to drop this ball of fire from low-flying fighters that skimmed over the fence tops and rammed home their projectiles with arrow-like accuracy. From such tests as these we learned something. The technique was used in combat against the actual bomb sites and it worked. That's how we knocked out so many of the weapons before they could even be used.

Such tests with the atomic bomb would cost billions. But they would be cheaper than the price of rebuilding New York or Chicago or Dallas. And perhaps after several such tests we'd know where to begin without risking guesswork.

The Air Forces have admitted their mistakes. These men aren't sitting back on their traditions. They've got some definite ideas on how to prevent push-button warfare—and on how to win it if it is suddenly thrust upon us. If they aren't shackled by lack of funds they will put some of these ideas into practice now to give us the kind of airpower protection we need. The P-80, they admit, already is obsolete. So is the B-29. That's why so many of our aircraft manufacturers are busy planning rocket planes and projectiles. And there isn't an AAF plane on the boards that won't be jet propelled.

We have plans for V-weapons larger, more powerful and more accurate than anything the Germans had planned—and their ranges are startling.

Some of the new aerial troop transports are so large that a squadron could transport whole armies and their equipment overnight almost anywhere in the world.

Giant bombers like the B-36 and the B-35, soon to be test flown, could be equipped to carry rocket-bombs approximately the size of the V-2s—and those bombs will have atomic warheads.

With such an array of stars it seems to me the time is *now* for us to see a *new* show. It's almost a certainty that if we don't stage the production somebody else will. Then, the chances are we won't be alive to buy tickets. That's why I say *beware the Crossroads!* END

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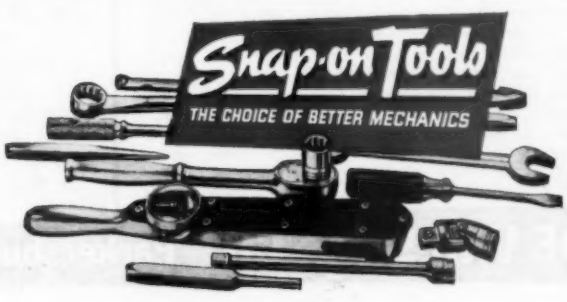

Report From Washington

(*Continued from page 37*)

when available. Pointing out that its current policy concerned feeders using only conventional type aircraft, the statement concluded: "Operations using a different type of aircraft, such as the helicopter, would doubtless present new and different considerations. It is possible that a combined pick-up passenger service, once proved safe and practicable, would also offer opportunities to increase the number of short-haul operations. Such questions will be considered when they come before the Board in future proceedings involving proposals for such new types of service." But even without the helicopter, close students of the feeder services at the Board seem to think their future, to say the least, definitely bright.

War Birds

"One question in the minds of many pilots," writes our favorite correspondent, Gaither Littrell, west coast editor for FLYING, "is how does it feel to fly in a North American *Twin Mustang* (P-82) during landings and take-offs? Some have the idea that the pilot, whether he be flying from the left or right side, has the feeling that he's off center." Having raised the question, Lit looked up Bob Chilton, chief pilot for flight engineering on the plane, who says that despite the offset fuselages he always feels that his particular cockpit is centered. He adds that it is extremely seldom that the left gear, assuming he is piloting from the left side, touches the ground first, or vice versa. . . . Also from the west coast comes rumblings of complaint concerning the military security attitude on the Douglas XB-43, a jet bomber with the lines of a B-42. The plane was recently moved across the highways from Santa Monica to Muroc Dry Lake, Cal., for testing. Hundreds of persons saw it, and it was photographed with its jet intakes and other equipment covered. Then it was announced that it was to be shown to the public on Army Day, April 6. But again the Army stalled. They still hadn't shown it as this went to press. . . .

Travel Service

Private pilots with travel as their goal have not been neglected by the post-war planners. Notable among these is Jack LaRocque, president of the Registered Travel Service for the Private Flyer, whose plans call for regional books telling the pilot all he wants to know about landing facilities, resorts, and hotel accommodations. First of the books is scheduled for publication sometime during the summer, and will cover New England, New York, New Jersey, Pennsylvania and Ohio. Next scheduled will cover Texas, California, New Mexico, and Arizona. And so on around the country. . . .

LaRocque and his associates plan to couple a campaign for better airports and better airport services to their information program. Further, plans are going forward to inform pilots on tax refund problems, change in Federal regulations, and similar data. . . . LaRocque is an aviation enthusiast who has specialized in aeronautical law; director of the Travel Service will be Richard Herold, ex-Navy Air Force commander and a lightplane pilot. Circulation of the travel books for pilots is planned on a mass basis through lightplane manufacturers and oil dealers.

Sea Lawyers

Every day or so we get envelopes fat with articles pointing with alarm at the way the United States is losing out in the world air commerce race because steamship lines aren't permitted to run the show. We stacked a sheaf of them up the other day and they were almost as high as the releases from the airlines telling how rapidly and how far our air services have already reached around the world, with bright predictions for tomorrow. Most alarming of the indictments from the sea lawyers is a document from the Sea-Air Committee of the National Federation of American shipping, so forcefully worded that we rushed down to the Civil Aeronautics Board to see if we were out of the world airways. We were assured that such is not the case. . . . The Sea-Air release quoted Almon E. Roth, president of the NFAS, charging "flagrant discrimination" by the CAB in granting franchises to Swedish International Air Line, a government-controlled operation with steamship affiliates, while denying an application by the Moore-McCormack steamship line, flying the American flag. Mr. Roth describes this as "unbelievable," among other things, adding that it would be "difficult to find a more glaring example of discrimination against American citizens by their own Government."

Board Reply

The Board answer to these charges are that it never has and never will discriminate against a U. S. operator, even if he is a steamship operator, so long as he does not *control* an airline making application for a foreign route. As for the Swedish franchise, to quote Welch Pogue, retiring Board chairman: "Some people seem to think that if you co-operate internationally you give something away. They somehow feel that some precious fragment of national sovereignty is sacrificed. I do not so view it. You can't give away something you never had. When you are dealing with another nation for international rights, such as air rights, you do not have the right to run through the other fellow's territory until he gives it to you. So we are not giving up a sovereign right when we make an agreement with another nation, a necessary part of which is a certain amount of co-operation in the policing of the operation. I predict with confidence that the only way we can avail ourselves of the advantages before us in the world is through a large measure of international co-operation." . . .

And speaking of predictions, here's one for Mr. Roth: upcoming franchises

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COWARD-McCANN

awarded by the Board in the foreign field will again exclude U. S. steamship interests unless they are minority stockholders in the airline concerned. It may be tough, but that's the way it is.

Boom Coming?

E. M. Rave of the service extension bureau of the Commerce and Industry Association of New York recently completed a survey of the future for post-war air transport and came up with a number of exciting facts. To put the worst first, 56 per cent of the persons questioned replied that they travel seldom or not at all by air because of their "fear for safety." Mr. Rave believes that this indicates a poor job of public education on the part of the airlines. Another thing that came in for protest from the surveyees was the loss of time experienced getting to and from airports—and municipal airport planners please copy . . .

The good news is good, indeed. "If we are to judge upon the basis of replies," says Mr. Rave, "airmail space requirements for transportation are due for some startling increases." Some 67 per cent of the firms replying to his questions will increase in this department, a few as high as 300 per cent. Air parcel post is also due for big patronage, if and/or when—"tremendous potential volume is indicated up to 100,000 pounds annually by one organization." Air freight "will increase by leaps and bounds," with 73.6 per cent of the companies planning shipments of from 20 pounds to 120 tons . . . Indications are that contract carriers will come in for their share of the potential boom and as for special services, "32.5 per cent of the companies contemplate special trips involving from a few to 30 flights monthly." Mr. Rave adds significantly: "This may provide the necessary incentive for small organizations which can specialize in supplying these services, and appears to hold some opportunity for war-time flyers using planes especially adapted for this type of transportation."

Co-operation Needed

Summing up the survey, Mr. Rave states that "if there is one fact that becomes increasingly clear as a result of these findings, it is the necessity for continued careful planning—planning in the co-operative sense between the transportation companies and civic authorities. It is of little avail to supply the public with the acme of rapid transport from perfected fields at terrific expenditures unless these, the servants of the people, really give a service to which the passenger and public are entitled . . .

The survey illustrates the need of co-operative committees working with the more practical problems concerned so that what the public receives is full measure of intelligent operation and administration of its carriers and depots." One method of best achieving this: "Through the liaison of local chambers of commerce or civic groups who are either in possession of or who are in a position to secure the facts on each question that may be involved and who have the confidence of the public in their motives." END

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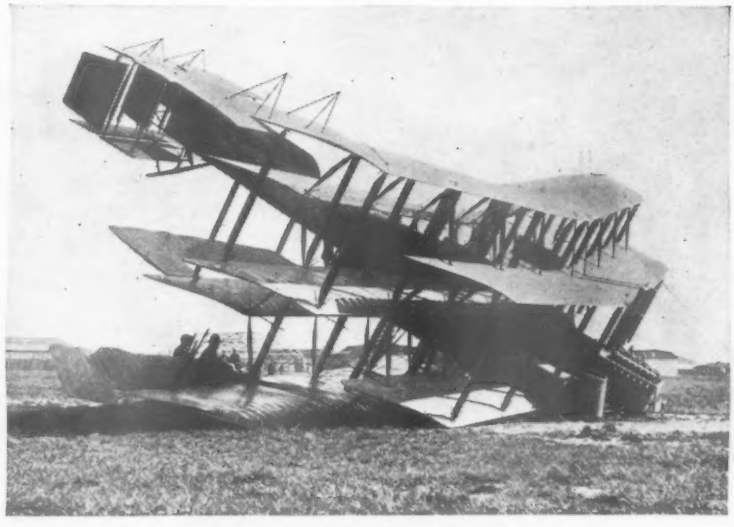

SEVEN-WING EAGLE

THIS grotesque relic of World War I was called the *Eagle* and was developed and built 25 years ago at Langley Field, Va. It was powered with three 450-h.p. *Liberty* engines—one mounted forward and two pushers.

Aiding in its construction was Royal O. Berkshire (more recently he helped build the Consolidated *Dominator*) who recalls that the *Eagle* was one of the first planes to attempt utilizing a welded-steel fuselage structure. The plane flew for 25 minutes on its maiden and only flight. On landing, the undercarriage collapsed, resulting in the above nose-up. It was never rebuilt and the seven-wing theory was abandoned.

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POPULAR PHOTOGRAPHY

• Getting ideas for pictures

Edward Jacobsen likes to help the amateur who is in search of photographic knowledge. He tells in an interview-story some of the ways to get better ideas for pictures and turn those ideas into real photographs.

• Photographing children at the beach

Wistful, playful, delightful story that tells you how to make those human appealing pictures of children playing at the seashore.

• A new era in 16 mm

A lively account of the great expanding 16 mm industry . . . home movies, school movies, industrial films . . . tells how you can rent film for an evening's entertainment, what sort of film to expect, and what is happening in the field of sound projection.

• Award-winning photographs

Victor Keppler reviews the Art Directors Show, and discusses award-winning photography by Joffe, Mili, Sarra, and others.

• World's largest x-ray picture and how it was made

• Controversy over soft-focus pictures

Felix Kraus defends the work of Gene Fenn, noted Harper's Bazaar photographer, and John Adam Knight, famous camera columnist for the New York Post, turns his vitriolic pen upon this type of photography.

• Snapshots or pictures

Tony Venti gives another lesson in his girl-plus-camera series, wherein wife Betsy learns a few basic fundamentals that will lead any beginner into good pictures.

• Portraits and pictures from the Art Center

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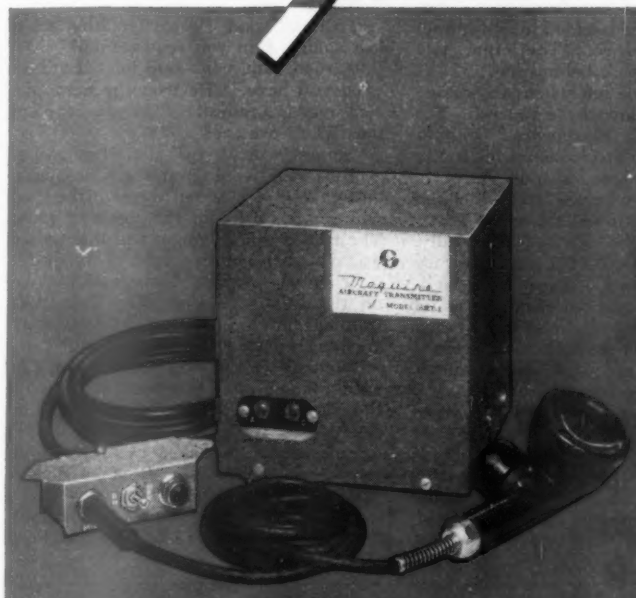
SOMETHING NEW IN AIRCRAFT RADIO



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I Learned About Flying from That!

(*Continued from page 62*)

much sooner," said I. "All we have to do is make the ground and map match."

Twenty minutes brought nothing but more flat fields, thicker haze, indefinite dirt roads and a group of airplanes that began to have a tendency to wander off from my leadership into vague S's while they hunted on their own. One turned off on a dirt road and started flying off at right angles to our course. We turned and followed him hopefully for a moment, dithered, and decided to sit tight on the course I had set. The other two planes dithered back behind me.

The second plane left when we crossed a railroad and followed the railroad. The white Taylorcraft disappeared without warning while my head was buried in the map. The last plane, a blue Aeronca, deserted us a few minutes later. I looked at Kenneth and grinned miserably.

"Let 'em go," he advised cheerfully. What else could I do? The sky was very big and very empty. A concrete highway curved into sight out of nowhere and dissolved away into the mist. We edged over to it. A touch of civilization seemed vaguely comforting and you couldn't deny it was going somewhere.

The gas gauge was registering close to zero when Kenneth saw a huge signboard with some tall letters on it. "What's that?" he yelled. We swept down, did a vertical past the face of it. An arrow pointed to Camden. We straightened out, thankfully, buzzed on into the airport and took off again, fully determined that things would go differently.

I was being very smart this time. No one else was going to do my navigating for me. Not for a second was I going to take my eyes off the navigation job at hand. I had taken a cup of coffee and three aspirins (no one had told me then what aspirin could do to a pilot's perceptions) and my head was splitting. Perhaps the aspirin was the reason Baltimore never came into sight.

Kenneth looked at his watch uneasily. "How much gas did you say we had?"

"A little over two hours," I said.

"Well!" said Kenneth. "I hope we see Baltimore soon."

"I think," said I wearily, "that we're lost again. Can you read a map?"

"A road map, yes," said he. "Let's see what you have." He took the map, puzzled over it a minute. "Do you have any idea where we are?"

"Somewhere west of the Chesapeake."

"But west would put the Chesapeake on our left?" I looked through the thick white haze below for the gleam of water. The ruffled dull silver of the Chesapeake was definitely on our right.

"Then we are lost," I admitted. "We're on the wrong side of the Chesapeake. Can you find anything else? Anything?" By that time it was . . . anything . . .

"We've been out how long?" said Kenneth. We checked watches. We checked the course we'd obviously been flying according to the Bay. "How about this airport here?" he asked finally, pointing to a little red cross. "It is an airport, isn't it? A red cross?"

"An emergency field," I said. "Where?"

"About 10 minutes south on the course

FLYING

"Ajax Map Co.? How come you don't show a tunnel on the railroad between Shelby and Oakdale?"

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"Swift completion" has become an increasingly important part of this service—and Air Mail has lent wings to the Post Office Department's traditional speed.

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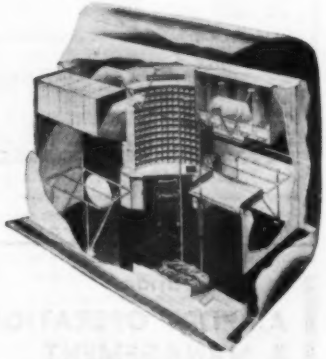
With the design for a flying mail car, typical Fairchild engineering ingenuity has again created the "touch of tomorrow in the planes of today"—converted the versatile Packet into a transport that anticipates the day when all first class mail will be sped toward its destination by air.



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we're flying, I think," he said. I set my teeth and blinked my eyes to try to see more clearly.

"If we had dual controls, I'd try to fly for awhile," he said. "It looks easy, and you look sick." I fumbled in the baggage compartment, hauled out a stick. He fitted it over the stub. I told him hazily about banking for turns or how to lift a wing and I turned loose of the controls. The plane wavered a little, steadied. What a man!

We picked up the airport on schedule. Napley Green, apparently, if Kenneth's emergency navigating was correct. I took the controls and we glided down over the trees. Too high. The field was the size of a handkerchief. The hangar at the father end loomed up. At the last minute I shoved open the throttle, zoomed. We cleared the roof by inches. We circled. I made another pass at the field, zoomed again, circled, and then dropped in a dizzy sideslip that dumped us in two feet of snow at the end of the runway.

We didn't roll. We stopped dead. There was dead silence.

"The field is deserted," I said. "No gas here."

"At least," he said, "we can see if it's Napley Green. There's a log cabin yonder behind those trees. I'll go over and get directions to Washington. We should be straight across the Bay from there now." He came back quickly.

"There's a very fat colored woman in there who thinks we-alls is in Ma'yland," he reported. "No gas here, but we can get some at Fort Meade, across the bay."

"The snow is awfully deep for a take-off, but climb in," I said.

He looked at the snow doubtfully. "Wish I had a shovel," he said. He started kicking the snow away from in front of the tires and I climbed painfully out of the plane to help. We cleared a space about twice the length of the plane. Sweating, we climbed back in. Kenneth looked prayerfully at the motor, I yelled "contact," and he swung the propeller. It burst into a pleasant roar.

With the help of the brakes to build up full power, we had nearly enough lift to leave the field by the time we hit the end of the somewhat-cleared spot. On the rest of the run, I lifted the plane out of the snow by brute force.

We found Fort Meade in a few more minutes. There were two open fields. One was an airport. Under the snow they looked alike. I chose one, took over the controls, and swept down for a landing. Then, across the road, I glimpsed what looked vaguely like a runway under the snow. We banked and turned across the road. We landed. A car idling along the road turned in and approached us. A captain climbed out.

"Anything wrong?" he asked. "My wife and I thought you were going to land in the tank-traps across the road. Gave us quite a scare."

Tank-traps! That would have been the last straw. But I couldn't worry much at that stage about a mere tank-trap. A mere crash. My head was stuffed with cotton. My veins were filled with fire. I looked at them numbly.

They carried me to Captain Selman's car and drove to the Selman's home. Mrs. Selman undressed me and tucked me into bed. The captain appeared with a steaming hot drink. "Something we keep on hand in case a friend is bitten by a snake," he said. "Good stuff. Drink it down and go to sleep until tomorrow. Your friend and I are going out and take a ride in a tank. He thinks he'd like it."

Of course he would. I buried my head in the pillow and wept—I wanted to ride in a tank too—and went to sleep. But not before I had made one resolution. We wouldn't make Alexandria to spend the first night with the tour anyhow, and in the future . . .

In the future, I was going to be physically fit before I flew anywhere. If you're not, what is the use of a physical in the first place? END

Lightplane Diesel

(*Continued from page 42*)

relatively trouble-free when compared with the conventional carburetion system. Carburetor icing, one of the most common causes of lightplane forced landings, is entirely eliminated.

One valuable advantage of the Diesel installation is the elimination of fire hazards. The fuel oil used is not inflammable under ordinary conditions and will not form an explosive mixture with air. Another safety factor is the absence of harmful amount of carbon monoxide in the Diesel exhaust gases.

The Stinson 105 in which the new lightplane Diesel is now installed was formerly powered with a 90-h.p. Franklin engine. Top speed with the Franklin was 90 m.p.h. at 2,400 r.p.m. The same cruising speed with the Diesel is accomplished at 1,600 r.p.m.

Fred Thaheld does his own test work and test flying. He hopes to accumulate enough engine hours to obtain a license for the Diesel by the middle part of this year. Diesel Power, Inc., a division of Shaffer Tool Works, Brea, Calif., is making plans to mass produce the engine as soon as it is approved. They already have expended more than $40,000 on the prototype. Future plans include a larger six-cylinder model for heavier planes.

Thaheld joined the Guiberson Diesel Engine Co. in 1929, where his first aircraft Diesel was designed and built. In 1930, this engine was licensed for aircraft use by the CAA. Thaheld served as vice-president and chief engineer of the Guiberson company for 16 years.

Thaheld's engine experience has not been exclusively with Diesels. Before going with Guiberson, he designed and built a 60-h.p. gasoline engine for the old Nieuport airplane. His next brain child was a five-cylinder radial job for three-place airplanes.

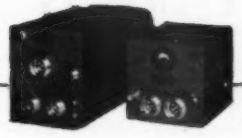
This backlog of experience is well reflected in Thaheld's latest Diesel engine. Lightplane manufacturers are keeping a close watch on the engine's development. They know that pilots and owners will welcome the freedom from trouble, low maintenance costs and extreme fuel economy which a successful Diesel engine would mean. END

your Signpost in the sky

For the private pilot who wants the last word in complete air-ground radio, ARC now offers equipment built to exacting Army-Navy standards. Featuring designs tested through millions of hours of wartime operation, the ARC Type 11 Aircraft Communication System provides top quality performance under conditions of vibration, moisture, changes in altitude and temperature, and shocks from rough landings.

The Type 11 System combines a wide band (190 to 550 KC) LF Range Receiver and a VHF Transmitter with provision for 5-channel operation at the turn of a switch. The small separate control unit is located for convenience of operation and the major units remotely mounted. This avoids disturbance of normal weight and balance of the airplane and usually permits a short antenna lead-in. The complete antenna system consists of a single vertical rod 22 inches long and is furnished with the Type 11 System.

This compact ARC equipment is based on more than 18 years of design and development in the field of airborne radio and is a *quality* instrument for the operator who requires the basic essentials in aircraft communication and navigation facilities. Remember, when selecting the radio for your airplane, nothing but the best is good enough—specify ARC. For descriptive information and prices, write Aircraft Radio Corporation, Boonton, New Jersey.



ARC ADVANTAGES

Light Weight — Less than 15 pounds for the entire Type 11 System installed.

Reliable Reception — Unusual sensitivity and selectivity plus rugged construction. Noise-limiting circuitry insures clarity of reception and makes shielding unnecessary in some airplanes.

VHF Transmission—Crystal-controlled on 2 preset channels, with provision for 5-channel operation to cover additional frequencies when allocated.

A Complete Installation — The Type 11 System is available complete with antenna, crystals, tubes, cables, microphone and headset — no extras to buy.

AVAILABLE FOR DELIVERY JULY 1, 1946

AIRCRAFT RADIO CORPORATION

BOONTON, NEW JERSEY

AOPA News

(*Continued from page 66*)

because of the general reduction in weight of radio equipment.

The question of maximum weight for aircraft radio was answered as follows: receiver only, 2½ to nine pounds; transmitter only, four to 18 pounds; receiver-transmitter combination seven to 20 pounds. Most manufacturers suggested 10 watts output for transmitters operating on a frequency of 3,105 kc. and stated preference of a fixed antenna in lieu of reel antenna. They wanted loudspeaker provisions and a rotatable loop included as standard equipment.

These additional features were listed by some manufacturers:

Provision for commercial broadcast band in the receiver; simplicity of operation and maintenance, including ease of removing and mounting; inclusion of good range filter; control wheel transmitter button; combined headphone and microphone (pilots hands free at all times); marker reception; freedom from engine noise without shielding or bonding.

The matter of cost of radio equipment averaged up about as follows: receivers, $15.00 to $35.00; transmitters $25.00; combination of receiver and transmitter (transceiver) $75.00, all prices to include mike, phones and accessories.

On the matter of shielding, the vote was pretty well split with slightly more than half expressing the feeling that it would be necessary to continue shielding engines in order to get satisfactory radio performance. All manufacturers felt that the radio industry should provide them with radios which could have front face panels changeable to fit the interiors of different airplanes for styling purposes.

AOPA offers congratulations to W. O. Stone, Jr., NASC Representative, R. Garfield and to others who sponsored and completed this interesting survey.

RMA PRIVATE FLYING COMMITTEE

AOPA, representing personal aircraft owners and non-scheduled flyers, met recently with the Radio Manufacturers Association special subcommittee on private aviation at Harrisburg, Pa., where important standards and test procedures were drawn up to cover all receiving and transmitting equipment used by non-scheduled flyers in the low frequency bands. Future meetings will establish similar standards and test procedures for the VHF equipment. The whole business comprises service to aircraft owners. END

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BEGINNER'S LUCK

A GOOD memory and plenty of luck rode in the cockpit with William G. Hampton, 41-year-old body and fender repairman of St. Paul, Minn., the day he went up for a demonstration ride in an *Ercoupe*.

No sooner had the plane taken off than Hampton's pilot, a wartime *Liberator* bomber captain, had an attack of combat fatigue. With the pilot completely berserk, Hampton took over the controls, flew around for 20 minutes trying to remember what he had read about flying, and decided to land the plane himself.

The landing was unspectacular but the run along the ground broke quite a few airport rules and put the *Ercoupe* in several dangerous spots. Hampton, who intends to continue flying, explained his wild taxiing with:

"Well, you see that's the first time I've ever been at the controls of a plane."

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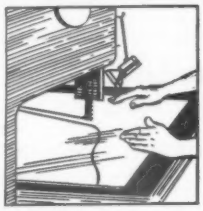
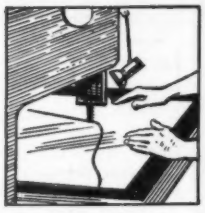
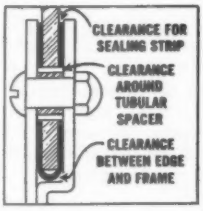


RIGHT WAY—Saw cuts are outside of trim line, so that edge can be filed and sanded smooth.



WRONG WAY—Saw cuts are right on the trim line, no chance to smooth off the edge.



RIGHT WAY—At least 1/16-inch clearance around all edges of the panel of "Lucite."

WRONG WAY—Cracking, buckling or warping may result from too little clearance.

"LUCITE" SHOULD BE FILED AND SANDED SMOOTH

Saw cuts on "Lucite" acrylic resin should leave a slight margin outside of trim line which should be first filed smooth and then sanded to remove the file marks. A medium-coarse file is best. Use 400 grit sandpaper. Wet sanding with water is superior to dry sanding.

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ALLOW GOOD CLEARANCE AROUND EDGE OF "LUCITE"

Leave clearance in bottom of channel for "Lucite" to expand and contract with temperature changes. At least 1/16 inch around each edge for pieces up to 24 inches square; ⅛ inch for pieces up to 60 inches square; .003 inch for each inch of panel width on larger sizes.

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What's more, "Lucite" even *costs less*, in medium and heavier thicknesses, than other plastics sometimes used.

It's easy to install enclosures of "Lucite," whether you do the job yourself or have your service man do it for you. A few simple instructions should be followed, such as those shown here. This "know-how" is important since "Lucite" is different from cellulose acetate and cellulose nitrate sheets.

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Plastics
BETTER THINGS FOR BETTER LIVING THROUGH CHEMISTRY

Marchev's 'Folly'

(*Continued from page 28*)

except along the trailing edge where the skin is basted to the frame with rivets like a seamstress lock-stitches the hem of a dress.

One of the most interesting departures of airplane making was in the construction of the wing floats. The simplified *Seabee* float has but four parts, while a conventional float would have at least four times as many. A conventional float is a benchworker's job; the simplified unit is almost entirely a product of the metal press. Once shaped, the float is quickly riveted together. Rivet holes are so placed that all work can be done externally.

The hull is another departure for seaplane construction. As originally planned, the boat-like *Seabee* hull was to have 362 parts which weighed 318 pounds and took 2,400 rivets to put together. Simplified, the hull now has 63 parts, weighs 298 pounds and saves 570 hours in building time.

According to some skeptics, maybe Republic was cutting factory costs by increasing outside purchases. What about the instruments and components which the factory does not build and which have to be bought from subcontractors? Marchev confronted the sub-assembly manufacturers with a mass order and then asked for the lowest cost per unit. At the same time he simplified specifications without reducing quality. Instead of buying the instruments separately he bought them as a unit which can be mounted in the instrument panel with but four screws.

The engine problem was solved by purchasing Aircooled Motors so that Republic is building its own 215-h.p. Franklin engines. The plane comes with a ground-adjustable propeller, but a controllable, reversible pitch propeller can be installed at the factory for an extra cost of $333.

Simplification of the *Seabee's* design has resulted in a lighter airplane and increased performance. Cruising range has been increased from the originally-specified 520 miles to 560 miles. Cruising speed is 103 m.p.h. and maximum speed is 120 m.p.h. Take-off over a 50-foot obstacle requires 800 feet on land and 1,000 feet on water.

Has Republic revolutionized the procedure for designing light airplanes—perhaps even the lightplane business itself? It is far too early to tell but one thing seems sure—the final verdict will be voted not by Republic, not by the industry, and not by the fixed base operator—but by the way the public receives this newest amphibian. END

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ADDRESS .....

London Letter

(*Continued from page 44*)

and creating three big state corporations to run them.

The customer's interests are to be looked after by an Air Transport Advisory Council which has been likened to the Civil Aeronautics Board of the United States, and which will be appointed by the Minister of Civil Aviation, Lord Winster.

This Council will advise on the efficiency of the three state corporations and on the needs of air travelers. The corporations are British Overseas Airways, British European Airways and British South American Airways. The capital for these corporations will be 200 million, 80 million and 40 million respectively.

Liquor In Air Liners

To those who have been in aviation since the early days, the remark made by Dr. Hugh Dalton when he introduced his budget for 1946-47 in Parliament, that in the future aircraft would be allowed to obtain licenses to sell tobacco and liquor was a complete puzzle.

British aircraft always had sold liquor in the past. On the London-Paris run an airline had to do this as well as to provide first-class food in order to compete with the fine wines and excellent dishes offered by Air France.

But it seems that officially they ought not to have sold liquor until they were outside the three-mile limit. And in any case, when they landed their bars were sealed by customs officials. Now aircraft will be in the same position as ships. But the only real difference is that a custom that had become generally accepted now will be legalized. END

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The Globe Swift

(*Continued from page 39*)

formance compared unfavorably with the figures claimed by Globe's sales department. For example, the best cruising speed I was able to get out of that plane was just under 112 m.p.h.—13 m.p.h. slower than Globe's advertised figure of 125 m.p.h. Rate of climb for this same airplane turned out to be just under 500 f.p.m.; Globe claims 700 f.p.m.

To devote this article entirely to the performance of NC-80551 would not be fair to the basic *Swift* design, however. This article, therefore, is being written after a delay while awaiting an Aeromatic-equipped *Swift*. One of these airplanes has been delivered to the Turgeon Flying Service, Northbrook, Ill. (near Chicago), and I flew it to get more favorable performance figures.

This newer Swift — NC-80574 — was flown from Sky Harbor Airport, the Turgeon Flying Service base. Altitude of this field is 680 feet. Weather conditions for the flight were: temperature 41°, dew point 21, wind 10 m.p.h. from 22°, and barometer 30.11.

GLOBE SWIFT SPECIFICATIONS
Approved Type Certificate No. 766

Engine	Continental C-85-12
Top speed	135 m.p.h.
Cruising speed	125 m.p.h.
Stalling speed	47 m.p.h.
Range	700 miles
Rate of climb (sea level)	700 f.p.m.
Service ceiling	14,200 feet
Gross weight	1,570 pounds
Empty weight	950 pounds
Fuel capacity	30 gallons
Span	29 ft. 4 in.
Length	19 ft. 7 in.
Height	6 ft. 2 in.
Wing loading	11.9 lbs. sq. ft.
Prototype first flown	9/7/45

Source: Globe Aircraft Corporation

Our gross weight at take-off was 1,615 pounds —45 pounds over normal maximum gross of 1,570 pounds. At this weight the *Swift* took off in 13 seconds without flaps; using partial flap it got off in nine seconds.

The rate-of-climb check was made between 1,600 feet and 2,600 feet above sea level. The airplane climbed the 1,000 feet at an indicated air speed of 80 m.p.h. at 2,400 r.p.m. for a rate of 666 f.p.m. A second climb was made from 2,800 to 3,800 feet above sea level at 80 m.p.h. and 2,350 r.p.m., and the rate was 625 f.p.m. So it is probable that the same airplane, without its 45-pound overload, will climb at the advertised 700 f.p.m.

Next flight test was for cruising speed. A measured mile course was used. Two runs were made in each direction, each at 1,300 feet above sea level and at 2,400 r.p.m. (normal cruising). Average cruising speed for the four runs was 118 m.p.h.

In the air, the *Swift* is one of the nicest-flying airplanes available. It is extremely light and sensitive on the controls, has unusually good maneuverability, superb visibility, and is one of the most comfortable cross-country airplanes on the market. Its stalling characteristics are quite acceptable, the airspeed needle wavering between 45 and 50 as she breaks and drops her nose slightly below the horizon. There is excellent aileron control at all times. I was able to maintain altitude at 53 m.p.h. and 1,900 r.p.m.

In landing, the gear is dropped as soon as you enter the traffic pattern and throttle back. A large red light is linked to the throttle and flashes continually as soon as the throttle is closed and until the landing gear is lowered. The plane is glided at 80 m.p.h. and, as the turn is made into the final approach leg, the flaps are lowered. The glide immediately steepens, giving excellent forward visibility. As with all flapped airplanes, the nose must be held down when flaps are lowered. The *Swift* then is flown down to the runway at what appears from the ground to be a steep angle. Airspeed is held at 80. The flare-off comes somewhat abruptly after the steep approach, the airplane being held off the runway as close to the ground as possible. As the airspeed drops off, the *Swift* sits down rather quickly. This airplane definitely is not a "floater."

The *Swift's* maneuverability on the ground is well above average. The pilot has good-sized rudder pedals that include toe pedals for the excellent Goodyear hydraulic brakes. Result is that the airplane handles very well in taxiing, take-offs and landings. The tail wheel is full-swiveling.

The only way the *Swift's* visibility in the air could be improved would be to install a clear bubble canopy instead of the present sliding panels. The present canopy system is being changed, I understand. The present sliding panels cannot be kept closed, even when the airplane is new and tight. Once the panels loosen up, the cabin would be extremely drafty; it is somewhat drafty even in the new airplanes.

The *Swift's* cockpit layout is one of the most attractive I have seen. All instruments have been specially designed to fit the overall layout and color scheme. There are the usual flight instruments, including a recording tachometer. In those *Swifts* equipped with the manually-operated Beech propeller, there is a small crank handle on top of the instrument panel, directly in front of the pilot. This handle must be cranked full left for take-off and landing, and right for cruising. This particular installation has one unpleasant feature: as the crank is turned it causes the compass mounted nearby to fluctuate as much as 10°, something I wouldn't want to have happen while navigating any sort of a cross-country trip.

The Aeromatic propeller is automatic and constant-speed, hence no control for it is needed on the instrument panel.

The switches for operating the electric-hydraulic landing gear and flaps are mounted on the panel directly in front of the pilot and side by side. First reaction is that they are too close together for comfort, but the designers have made it

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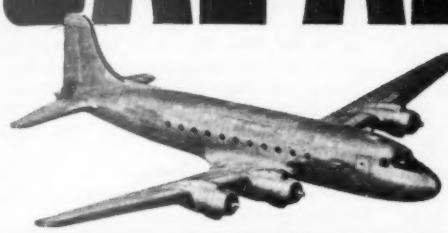

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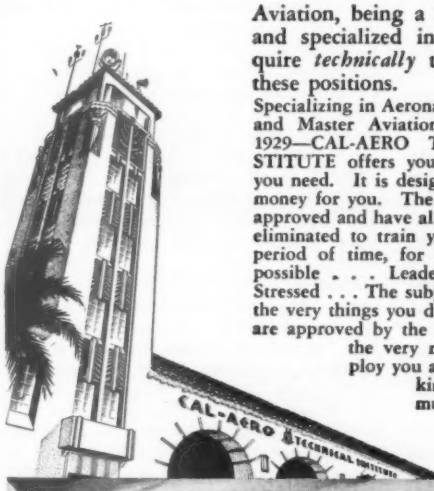

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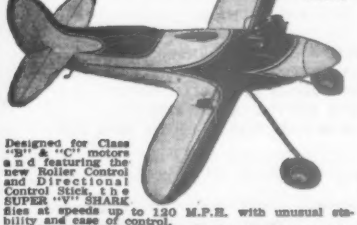

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extremely difficult for even the most inexperienced pilot to mistake one for the other. The landing gear switch is a long-armed handle that is lifted up or down. It cannot be operated until a safety catch is thrown. The flap lever, meanwhile, is a large, round, ridged knob that is turned clockwise to lower the flaps. The pilot thus can identify each switch both by sight and feel.

Only trim tab controlled from the cockpit is that on the elevator. The tab-operating handle is behind the seat and directly under the top of the hatch. To reach it in flight is awkward with two people in the plane, since the pilot must twist sideways and reach behind him.

Mounted just above the floor between the seat is a large handle for cranking down the landing gear should the electrical system fail. I experienced such a failure on one of the *Swifts* I flew at the factory. Both the landing gear and flaps failed at the same time, probably just after I had retracted the gear on take-off. As I approached for a practice landing I threw the landing gear switch and nothing happened. None of the electric gear-position lights were working either. So I circled the field while I cranked the gear down with the emergency handle. When the crank would turn no further, indicating that the gear should be down, I discovered that there was no way to check to be sure it was down. My passenger and I tried standing up in the cockpit in an effort to see over the leading edge of the wing but it was no use. The *Swift's* gear is so located in the underside of the wing that it is impossible to see either wheel from the cockpit. I had no alternative but to go in for a landing, hoping that the emergency crank had worked. Just as I turned from my base leg to the final approach, my passenger yelled that the gear was down, all right. He had seen our shadow on the ground! The flaps, meanwhile, were inoperative but an uneventful landing was made without them.

It is imperative, of course, that there be some positive means of checking on the landing gear's position on the *Swift*.

Accessibility to the engine for maintenance is very good. The whole cowl can be opened upwards or removed entirely.

The *Swift* sells for $3,495 f.a.f. This price includes the constant-speed propeller, starter, heater, generator and 12-volt battery. A new version of the *Swift*, the GC-1B, will soon be ready. It is the same basic airplane, but with a 125-h.p. Continental engine. The manufacturer claims it will cruise at 140 m.p.h. It does not yet have its A.T.C., nor has its price been announced. —MAX KARANT.

Aviation's Sound and Fury

(*Continued from page* 58)

demned and destroyed . . ." "Hundreds of homes adjacent to the airpark will be ruined because of the noise and tumult and commotion incident to taking off and landing."

Last November, four Burbank, Calif., residents filed suit against Lockheed Air Terminal, in San Fernando Valley, for $100,000 damages. Their main complaint was noise. The plaintiffs were awarded some damages, though not as much as they had asked. Glenn O. Lynch, a Burbank dairyman, was awarded $5,000 on his testimony that he had had to sell his dairy because planes buzzing his herd decreased the milk output to unprofitable levels. Other plaintiffs received minor awards.

But how can you lick noise? Technically, so little is known about it that engineers aren't sure just how to proceed. Unlike the automobile, which used to be the target for anti-cutout ordnances before mufflers were commonplace, the airplane's racket doesn't come primarily from the engine. The propeller is the greatest offender—in fact it's a fairly efficient siren all by itself. A fire siren, for example, is simply a series of whirling blades through which a stream of air is passed. So is a propeller.

One engine manufacturer estimates roughly that about 40 per cent of plane noise is caused by the engine exhaust and about 60 per cent by the propeller—but this is, naturally, a variable figure. And, as we shall see, elimination of the engine noise alone wouldn't affect markedly the total noise that reaches the ear.

Experts are fairly gloomy about their chances of beating noise. Frank W. Caldwell, director of research for United Aircraft Corporation, explains that the only way to reduce propeller noise is to bring tip speed down to around 500 to 600 feet per second. But—the most efficient propellers have a tip speed running up to 1,000 feet per second. Furthermore, to bring tip speed down to tolerable noise levels would require heavy props with a big diameter. Planes with such props would have to have longer landing gears and multi-engined planes would have to have greater spacing between the nacelles.

Caldwell says that such an arrangement would be "almost prohibitive from the standpoint of efficient airplane design," though he thinks, too, that it's just possible something could be done with lightplanes. He sees three possibilities: (1) larger, slow-moving propellers with reduction gears ("possibly too expensive and heavy"), (2) a propeller with a diameter 80 per cent of the present propeller, and with a blade twice as wide, (3) rubber coatings on propellers (which might make a slight improvement).

Another, somewhat unorthodox suggestion has been based on a theory that the propeller itself acts as a "sounding board" for engine noise and could be muffled. Muffling the engine might end part of this "sounding" but to reduce it substantially would require a means of insulating the propeller from engine vibrations. Whether the idea has merit, however, remains to be proved.

Another difficulty is that propeller noise is greatest during take-off and climb, since the engine is running at maximum speed. With an adjustable or controllable-pitch prop, the pitch is flattened to develop maximum thrust horsepower;

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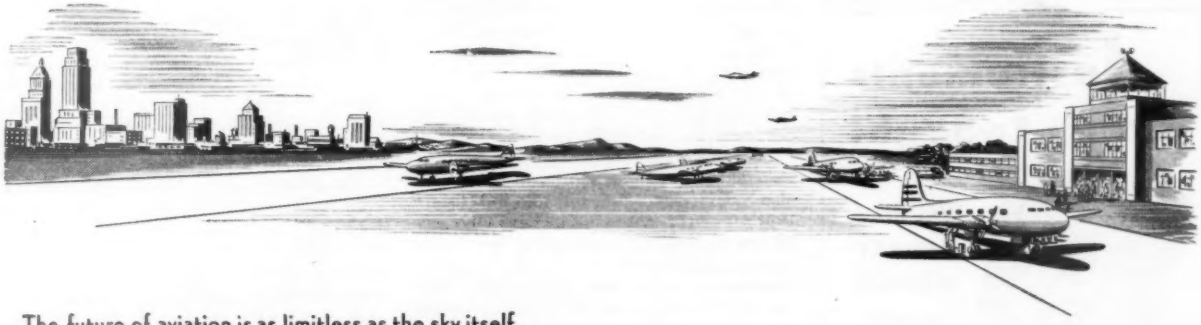

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during take-off, the tip speed causes a very high discordant whining noise.

Engine noise is simpler and far easier to solve than propeller noise. R. B. Fox, installation engineer for Lycoming, estimates that a well-designed muffler will not cause more than a one per cent loss in engine power. However, unless propeller noise is overcome, muffling an airplane's engine does not substantially reduce the noise as measured in decibels. This comes about because when a noise originates from several different sources, the predominant noise drowns out others.

The National Aeronautics Association explains that two noises of equal intensity, combined, will raise a total racket only three decibels higher than either of the two. If the noise from one source is nine or more decibels greater than the others, then the total noise will be that of the loudest single noise. To put it into figures, if a propeller is kicking up 80 decibels, and the motor is likewise registering 80, then the total noise will be 83—not 160.

So far we've been talking only about noise heard by people outside the plane. What about insulating the interior? Vast strides have been made in sound-proofing commercial aircraft. Bureau of Standards tests show that the passenger in an airliner today actually is subject to less noise from the plane than a person on the ground a quarter of a mile away!

The new *Ercoupe*, the Cessna 140 and the Stinson *Voyager 150* are insulated and the *Ercoupe* and Stinson have mufflers which reduce their cabin noise even further. *Ercoupe* has even found that a thick rug on the cockpit floor reduces noise markedly.

The most thorough job has been in the *Voyager*. In addition to the exhaust muffler, thick blankets of Fiberglas are installed around the entire cabin except the windows. The interior upholstery further absorbs sound. The plane's cabin is so quiet that conversations can be carried on in a normal tone and the standard radio installation calls for a cabin dome speaker in place of earphones.

But the other noise problem—reducing sound to more tolerable levels for persons outside the airplane—is unsolved. One ray of hope: the National Advisory Committee for Aeronautics is turning its attention to airplane noise. But much work remains to be done.

Until plane noise is quieted flyers all over the country will be leagued against property owners who feel that the only way to abolish noise is to abolish airports. END

Letters

(*Continued from page 6*)

and loss statement for the third year and discovered he could make another $10,000 just by correcting his mathematics.

There are some parts of the story I find hard to believe. Is there really a 40 per cent net profit in aviation gasoline? 50 per cent net profit in oil? 50 per cent net profit in airplane maintenance? When Skyranch rents a plane for instruction at $7 per hour, will the renter also be charged for gas and oil used? Will all of the 200 plane owners who pay $5 per month for staking-out privileges always refrain from buying gas at other airports at which they may land? Will the 12 T hangars (at $8,500 each) be for the exclusive use of B-29's? Are there any more of those choice 160-acre plots available for $500 per acre? Could any farmer take what is left of 160 acres of desert after taking off space for airport and complete recreational facilities and grow enough of anything to make $14,000 net profit in a year?

HAROLD E. RODARME

Joplin, Mo.

● Reader Rodarme's mathematics are correct. Net profit should have been listed as $56,800. Answering his other questions in order:

There is between 35 and 45 per cent profit in aviation gasoline.

Cost of oil is 66 cents per gallon and it's sold for $1.40—a little over 50 per cent profit.

Plane rental at $7 per hour includes gas and oil but not an instructor's fee.

As to the 200 plane owners buying gas at Skyranch, Manager Noir says they will not always buy gas there but other itinerant flyers will bring total sales to even more than he estimated. He states his figures showed he underestimated his sale of gas to transient planes.

As to the 12 hangars, $8,500 each meant 12 units, each housing 12 planes.

Manager Noir states there are no more 160-acre lots available within 20 miles of Los Angeles at $500 per acre. Naturally, as the airport is built up, available farming ground decreases. So far, at Skyranch, 35 acres have been used for runway, taxi-strip, and parking space.—ED.

PRIVATE PILOTS ARE GOOD!

We private pilots are used to being blamed for almost everything. If a DC-3 feels its way home through a snowstorm at "roof-top" level, everyone who can guide a pencil writes a letter to the papers about the crazy (or drunk) "amateur flyer who almost hit my chimney while stunting over my house in the storm. The snow was too thick for me to see the plane, etc., etc."

Now FLYING gives us the needle on page 46 of the April, 1946, issue in the article "Pilot Error Sense," by saying ". . . private flyers who, incidentally, have one of the highest accident ratings of any airplane operating group."

For contrast, however, turn to page 20 of the Civil Aeronautics Journal for February 15, 1946. There, under "Report on CAR Violations," you will find: "Accidents involving violations of safety regulations numbered 426. The student pilot was the chief offender. Next was the commercial pilot . . ."

EDGAR END, M.D.
P-326432

Wauwatosa, Wis.

SURPLUS AIRCRAFT SALES

I have just read in the May, 1945, issue of FLYING the letter by "Navy Pilot" and Congressman Carter Menasco's reply con-

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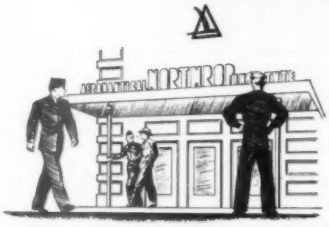

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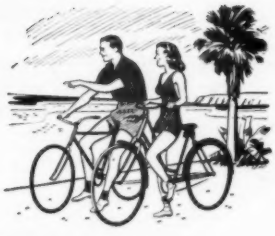

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cerning disposal of surplus Army and Navy lightplanes. I'd like to tell you what is being done in this theater.

Recently [an order] came out to send all L-4s to a field at Goppingen, Germany. I arrived there with my group's L-4s and found about 1,000 already there, with close to 100 on their backs. We learned they were all being purchased by one American company, the Aero Union. On inquiry, we found that a flat rate of $300 per L-4 in lots of 1,000 was being paid and that they were then being sold to foreign governments, Switzerland, Belgium, etc., with no restrictions in the contract as to selling price.

There was, so far as we know, only one representative of this Aero Union on the field. Army pilots ferry the planes, making the whole thing a transaction on paper—a mighty lucrative transaction, too, when you consider that the selling price is certainly between $500 and $1,500.

In the light of all this, Senator Manasco's letter is ridiculous. And it can't help but make one sore when one considers that the Government could hire its own salesmen, if necessary, and get at least a fair return on its outlay without the Aero Union and its unearned profit. If I had $300,000 I'd like to triple my money that easily. And I have $300 to spare for an L-4 any time they'll sell me one for that.

ARMY PILOT

APO, N. Y.

● FLYING asked the State Department in Washington, which has charge of the disposal of surplus foreign sales, for a reply. Robert J. G. McClurkin, Deputy Director of the Aircraft Division, wrote:

"One of the major problems faced in the disposal of surpluses overseas by the Office of the Foreign Liquidation Commissioner is the lack of dollar exchange with which surpluses can be purchased. Thus, when a great many aircraft are declared surplus in a short period, they find no ready market and are subject to rapid deterioration. In such a situation, when a customer offered to pay U. S. dollars for a large quantity of aircraft in Europe during the winter season when sales of aircraft always lagged, it seemed best to negotiate a deal with him, even at prices in the lower range. That's the background of the Aero Union contract for L-4s. It was closed on April 1. It was not an exclusive contract, blocking out other purchasers. Less than 100 aircraft were delivered under it. L-4s are still available and becoming available as surplus in Europe.

"To the extent that members of the Armed Forces who desire to purchase aircraft for re-sale can comply with regulations, they may compete on even terms with others in such purchases. If such aircraft are to be purchased by them for their own use, they will be accorded the usual veterans' preference."

ROBERT J. G. MCCLURKIN
Deputy Director
Aircraft Division

Washington, D. C.

"THE LAST BOUQUET"

In the Washington column of the March issue your West Coast editor was credited with bringing the verse "The Last Bouquet" from Pearl Harbor. The author is not anonymous, however. Gill Robb Wilson wrote the poem and it appeared in the May 15, 1937, issue of *The Sportsman Pilot*. I also have seen typewritten copies posted on the walls of small, out-of-the-way airport offices.

HARMON HAMMELEF

Phoenix, Ariz.

● All credit to Mr. Wilson; our thanks to Mr. Hammelef.—ED.

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